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OUTLINES

OF THE

HISTORY AND FORMATION

OF THE

UNDERSTANDING.

BY THE AUTHOR OF
"OUTLINES OF SOCIAL ECONOMY."

William Ellis

LONDON:
SMITH, ELDER AND CO., 65, CORNHILL.

1847.

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THE Publishers have instructions to supply a single copy for 6*d.* to any Schoolmaster making a written application.

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TO ALL EARNEST SCHOOLMASTERS.

FRIENDS AND FELLOW-LABOURERS,

I am not afraid of being charged with presumption—I am confident that you will do justice to my motives—in thus addressing you. I wish to express, with humility and devotion, the mixed feelings of affection and reverence which I really entertain towards all who are engaged in your arduous and noble calling.

To such of you as are already familiar with discussions on subjects connected with the structure of the Understanding, it need not be said that, in the following pages, it is not pretended to offer anything original. Whatever of good, and useful, and true is in them, has been freely borrowed from the great lights and leaders of the world—in spirit still with us, though departed in body, and from one mightier than all, inasmuch as he has added to his ample inheritance, the results of his own successful researches and happy combinations, who still lives labouring like a giant to enlighten and improve us, whom for me to attempt to eulogize, would be as arrogant as it would be impertinent.

To those of you, however, whose thoughts have never been directed to such subjects, I would more particularly address myself. I would implore you to devote a portion of that small space of time which is left to you from the performance of your practical duties, for the purpose of perusing and pondering upon what I have attempted to submit to your attention. I have purposely avoided quoting any author, or leaning upon any authority. Upon truth I have wished to lean, and upon nothing but truth do I ask you to lean. Read, study, and judge for yourselves. Give a ready and grateful welcome to what is new, if it be true and useful. Reject, without ceremony, what is false and useless, whether new or old. Pardon, also, the numerous imperfections of exposition which will force themselves upon your notice; attribute them to my incapacity, not to any difficulty or mystery in the subject, nor to any want of clearness in the great works which I may unintentionally have garbled, and which, I trust, you will hereafter be induced to consult.

A new light is dawning upon the world. Society is daily becoming more and more sensible of the errors of its former ways. The schoolmaster is destined to be ranked, henceforward, among the most instructed, the most useful, and the most revered of mankind. He is, to use the graphic language of a distinguished modern, no longer to be a mere "gerund-grinder," a mere dealer in the husk and shell of knowledge, perversely and ignorantly working so as to prevent his pupils from ever tasting the kernel within.

In a valuable contribution to the cause of education by the Rev. Mr. Dawes, a small pamphlet filled with the most instructive and suggestive matter, there is a paragraph which bears so forcibly upon the duties and qualifications of a schoolmaster, that I will take the liberty to extract it:—

"The school at Sligo appeared to me a very interesting one, but I had no opportunity of examining it. I had some conversation with the master in the school on the subjects taught, and the manner of teaching them. He was clearly well trained, and took great interest in his work. He had various specimens of the rocks and minerals in the county and neighbourhood, and knew how to take advantage of local circumstances in order to interest his school. This it is in a teacher which insures success; and it cannot be too much impressed upon our schoolmasters to talk to the children of the nature of the things about them, the animals, vegetables, minerals, and in fact to interest them in that part of the creation which is rubbing against them at every step. If a teacher knows well how to do this, the children will smooth all difficulties with the parents, and it gives a life and action to the whole, which nothing else will do."*

Yes, my friends, talk to your children, freely and perpetually, on all subjects—on the "nature," not only of some things, but of all things, and among them, of that most curious and interesting of all things, a specimen of which they always have about them,—the human understanding, Above all, as they progressively become, under your parental guidance, more and more acquainted with the nature or laws of things, let them learn how necessary it is for their happiness, that their own conduct should be regulated by these laws. Teach them to observe for themselves, how misery, suffering, and discomfort, are almost always traceable to a disregard of these laws—a disregard sometimes arising from ignorance, sometimes from inattention, sometimes from inertness. Point out to them, that as fire warms or burns, water supports or destroys life, medicinal agents cure or kill, according to the manner of using them, so also will the understanding guide to happiness, or hurry to destruction, according to the pains taken to exercise and form it. Let nothing induce you to suffer them to be blinded to the "nature" of their duties. "The laws of creation" are what must "rub against them at every step." Neither sanction nor tolerate any attempt to prevent their learning thoroughly that their duties consist in a steady attention and adaptation to these laws, under whatever system of classification they may be arranged, by whatever names designated,—physical, intellectual, moral, or social. According to their steady performance of the duties corresponding to these laws, will they find the laws themselves, uniform and undeviating as they are, "rub against them," so as to promote their happiness or to make them miserable.

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* "Hints on an Improved and Self-paying system of National Education," by the Rev. Richard Dawes, A.M. London: Groombridge and Sons.

Yes, my friends, talk to your children—talk fervently, affectionately, and truthfully, and unappreciated as you yet may be for a time, chilled by faint praise, and thwarted by meddling ignorance, they will love you and hang upon you while children, and bless and revere you when grown into men.

THE AUTHOR.

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OUTLINES
OF THE
HISTORY AND FORMATION
OF THE
UNDERSTANDING.

INTRODUCTION.

NOBODY ever made much progress in knowledge, without having his curiosity excited, from time to time, to learn what this knowledge really is—how he arrived at it—what more it was possible for him to acquire—and what is not within the reach of his faculties.

Where is the history that can be more interesting to any human being than the history of his own Understanding, when once he has accomplished the task of unravelling it, or been able to contemplate it when unravelled for him by others? What history is

to attempt, pointing out, as we proceed, some of the more obvious causes of good and evil, as well to the individual as to society.

SENSATIONS.

Observe the new born infant—it sees, it hears, it tastes, it smells, it has the sense of touch.

The impressions made upon us through the various organs of sight, hearing, taste, smell, and touch, are called *Sensations.* Some of these sensations are soon seen to be agreeable, and others disagreeable to the infant; in other words, it has sensations of pleasure and pain. Besides the sensations received through the medium of the five senses, it has sensations of comfort and discomfort, satisfaction and uneasiness; or, to preserve the same expression, of pleasure and pain, as a consequence of the general state of its health. It smiles and it cries.

We must dwell a little upon what the first sensations of the infant are. We must not confound them with what, from long habit, we sometimes imagine our own to be. Experience has shown us that sensation is one thing, and inference from it another; although the sensation and the inference from it are frequently imagined to be the sensation itself. There have been various ingenious devices to exemplify this distinction between the sensation and the inference united, and the same sensation severed from the inference, many of which will be familiar to most readers. We must content ourselves here with referring to three striking instances; the first connected with the ear, the second with the eye, and the third with the touch.

We hear a sound, and infer that it comes from an adjoining room—whereas a practised ventriloquist, unknown to ourselves, is making it at the back of our chair.

We look up to the sky, and see the moon, the planets, and the stars, and, till better instructed — that is, able to interpret our sensations, or correct our inferences, we imagine them all to be equally distant from us—the moon to be the largest, and the planets to be larger than the stars. We think we see distance in the panorama of the artist, as well as in the real landscape before us.

We cross two of our fingers, and roll a marble or pea between them, and we fancy that we feel two marbles or peas, whereas we merely have a sensation similar to that from which we are in the habit of inferring that we feel two marbles or peas.

With just so much caution as these instances would suggest to all reflecting persons, let us return to the sensations of the infant.

It sees light and shade, and colour, but not having learned to appreciate or measure distance, it grasps at what is not within reach. It hears sounds, but does not turn itself in the direction whence the sounds proceed. It tastes, it smells, and moves its little limbs, receiving sensations of the sweet and the bitter, the hot and the cold, the hard and the soft, the flat and the round, the smooth and the rough, the sharp and the blunt, the light and the heavy, and so on, and, what must not be forgotten, the agreeable and the disagreeable. These are its first lessons. As yet it has nothing like what we call experience. It would put its hand in the candle, and would suck anything presented to its lips. Let a few weeks pass, and it begins to distinguish one person from another; it moves its eyes and ears as different objects and sounds present themselves; it shews a preference for individuals, and manifests a relish or distaste for objects, as they approach its nose or palate. It not only has sensations, but i retains traces of, or remembers the sensation which it has had.

IDEAS.

Sensations past, but remembered, are calle Ideas. There is this invariable distinction between sensations and ideas—to have sensations whether of sight, hearing, taste, smell, or touch or of several combined, the object which cause them must be present to the organs of sense to have ideas it is requisite, not that the objec should be present to the organs of sense, bu that the sensations, to which the ideas correspond, should have been previously experience

Making use of the term Feeling to deno every state of consciousness that we are awa of: among our feelings we can distinguish t kinds—one, of those which exist when the c ject is present to the organs of sense; anoth of those which exist after the object has cea to be present to the organs of sense. first of these we call Sensations—the sec Ideas.

We see a horse, and know that it is the ox which we saw yesterday. We he neighing, and know that this does not r ble the lowing which we heard yesterday. We taste or smell an apple, and know that the taste or smell is different from that of the pear which we tasted or smelled yesterday. We touch a piece of iron, and we distinguish the sensation from that which we have formerly experienced from touching a piece of wood. We could not make these distinctions if we had not ideas as well as sensations.

As our sensations are derived from objects, and our ideas from sensations, so we have ideas of objects as well as of the sensations derived from the objects. The ideas of the simple sensations are termed simple ideas, and the ideas of the objects, which we derive from a cluster of sensations, are termed complex ideas. Thus, we have simple ideas of white and black, hard and soft, sweet and bitter, loud and gentle; and complex ideas of the snow, from which we have derived sensations of white and cold; of coal, from which we have derived sensations of black, hot, and hard; of pudding, from which we have derived sensations of sweet and soft; and of a drum, from which we have derived sensations of loud and gentle sounds.

The infant, then, after the lapse of a few weeks, not only smells and tastes sweets and bitters, but has ideas of its previous smells and tastes of sweets and bitters. It also has ideas of its previous sensations of touch, sight, and hearing.

As some sensations are agreeable, and some disagreeable, so is it also with ideas. The inexperienced infant would put its finger into the candle; but "the burnt child dreads the fire." The idea of the painful sensation of burning, causes the child to shrink from a repetition of the painful sensation. The idea of the pleasurable sensations previously received from its mother, causes it to evince the most unequivocal signs of delight at her approach, and of regret at its separation from her. All the new sensations successively experienced now begin to be more or less connected with the ideas of past sensations; and the sight or touch of a person, or of a spoon, or the sound of a voice heretofore indifferent, may be the source of the most lively joy, or of the keenest anguish.

ASSOCIATION OF IDEAS.

Sensations are excited by objects; and among the objects which present themselves to our senses, we early distinguish two orders of arrangement:—1st, the order of succession; and 2ndly, the order of co-existence, or the order in which, if there be succession, it is disregarded, or not dwelt upon, as being of no importance. Thus we receive sensations in the successive order, and sensations in the simultaneous or synchronous order. As examples of sensations of the successive order, we may take those which we derive from the observation of animal and vegetable life—from the seed put into the ground, the germinating plant, the blossom, and the ripened grain. We might also refer to the successive beats of a pendulum, to the successive strokes of the piston-rod of a steam-engine, and to the various operations of manual labour. As examples of sensations received in the synchronous order, take the smell, and the sight, and the touch of a rose; the smell, and sight, and touch, and taste of an apple; the sight, and touch, and sound of a trumpet; and the sight and touch of the room, forms, desks, books, and maps with the sound of the voices in a school.

Now, of those sensations which have occurred synchronically, it will be found that the ideas also have a tendency to spring up synchronically. I see my schoolmaster; and the sight of him excites in me the ideas of my school-fellows, the forms, the books, the maps, the exercises, the room, the village, and of a host of other objects, the sensations from which were received synchronically.

Among our synchronous sensations, none are more deserving of attention than those derived from what we call an object, such as a stone, a flower, a chair, a table, a house, a man.

From a stone we have received synchronically the sensation of colour, the sensation of hardness, the sensations of shape and size, and the sensation of weight. When the idea of one of these sensations occurs, the ideas of all of them will generally occur. They occur synchronically, and together they are called the idea of a stone, which it is thus plain is not a single idea, but a number of ideas in a particular state of combination.

So also the smell, and the sight, and the touch of a rose, have been experienced synchronically. Accordingly, one of these sensations will excite the ideas of all these sensations synchronically, and this combination of all those ideas is called the idea of a rose.

When once attention has been seriously directed to the separate contemplation of our sensations, of our ideas, and of the association of our ideas first with sensations, and then with one another, the difficulty of understanding what it is that really happens when we observe an object of sense, vanishes at once.

Let us suppose ourselves, deprived of the sense of sight, to be affected with a variety of smells. As they succeed one another, we pronounce that we smell roast-mutton, vinegar, a lily, a foul drain, and so on; and yet, in reality, we only infer from the sensations of smell, that they are produced by the objects mentioned, of which we have ideas associated with those sensations. The blind, and deaf, and dumb, have been known with the sense of smell so acute, and their ideas of smell so strongly associated with other synchronous ideas, as to be able to recognise their friends and acquaintances by that sense alone.

Or let us suppose ourselves, under similar circumstances, to be affected with a variety of sounds. As they succeed one another, we pronounce that we hear a trumpet, a drum, a horse, a cock, and distant thunder. In reality, we only infer that these sounds have been caused by the objects mentioned, of which we have ideas from previous sensations. The blind have their sensations of sound so strongly associated with ideas of other synchronous sensations, as to be able to recognise with remarkable accuracy, by their sense of hearing alone, every description of object from which they have received sensations of sound.

Again, let us suppose ourselves to be affected with a variety of sensations of sight. As they succeed one another, we pronounce that we see a cat, a dog, a cube, a globe, a pyramid, a book, not far from us; or a tree, a mountain, the clouds, the sun, at a considerable distance: and yet, in reality, we only infer from the sensations of light and shade, and of colour, with which we are affected, that they are produced by the objects mentioned, of which the ideas are associated with these sensations of sight.

Similar illustrations of this habit of inferring from sensations the complex ideas of objects, might be furnished by the senses of taste and touch. More than enough of illustration has most probably been adduced.

The conclusion is obvious. The objects of sense, as they are called, are the objects, not of mere sense, but of sense associated with ideas. And hence the importance of a judicious exercise of the senses; that is, of promoting such an association of ideas as is conformable with the real and demonstrated existences, and not the unexplained and deceitful appearances of objects.

As the ideas of sensations received synchronically have a tendency to occur synchronically, so the ideas of sensations received successively have a tendency to occur successively.

The sound of the first word of a line which we have read attentively, will excite the ideas of the remaining words in the order of their occurrence. We can count from one to ten more readily than from ten to one. We can repeat the alphabet from A to Z with greater facility than from Z to A. The sudden sight of a fellow-countryman in a distant land will call up in succession the ideas of our native land, the ship in which we sailed, our regrets at departure, the occurrences of the voyage, our impressions on landing among strangers, our subsequent employments, struggles, and anxieties, and the results accomplished up to the present hour.

The varieties in the "association of ideas" in different times and countries, are very remarkable, as may be seen by a mention of a few of them as they occur to the memory. The sight of the sky has been associated with the ideas of stars, planets, sun, and moon, all equally distant from the earth, and moving round it, the moon larger than the planets, and the planets larger than the stars. It now excites ideas of the earth revolving on its axis, and moving through space among bodies of unequal magnitudes, but the real differing greatly from the apparent magnitudes; some few comparatively near, and others immeasurably distant from us. The safety of a ship about to depart on a long voyage has been associated with the ideas of setting sail on a lucky day, and of a horseshoe nailed to the mast; it is also associated with accurate compasses and chronometers, quadrants, sextants, and charts, instructed and experienced navigators, and abundance of stores and provisions. An eclipse of the sun, with ideas of dismay and danger, and of noise, to frighten away the dragon; and also with the idea of the moon's temporary intervention between the earth and the sun. A storm of thunder and lightning, a drought, and a blight have been associated with ideas of the anger of heaven; and also with electrical and atmospheric agencies, partly explored and understood, but still requiring further investigation, and presenting inducements to man to continue the cultivation of his powers of observation and reflection. The crime of an erring brother has been associated with ideas of vengeance, and also with ideas of prevention and reformation. Starvation, fever, and mortality have been associated with ideas of the evil eye of a witch, and of the necromancy of an astrologer; and also with ideas of ignorance and improvidence, imperfect drainage and cleanliness, neglected education, and defective social arrangements. The height of happiness has been associated with ideas of fine houses, fine carriages, fine clothes, and fine company; and also with ideas of self-improvement, and unceasing endeavours to diffuse knowledge and happiness.

Which among these various "associations of ideas" shall prevail, is greatly within human control. From the first ideas retained by the child, we must date the first associations. We cannot, therefore, too soon ask ourselves such questions as the following:—Is the child to associate the gratification of its desires with anger and tears, or with self-restraint and smiles? Is it to associate knowledge, application, and useful labour with ideas of pain, hardship, and disgrace, or with ideas of pleasure and self-satisfaction? Are its aspirations after excellence to be associated with ideas of the inferiority, regret, and mortification of others, or with ideas of mutual kindness and good fellowship? The answers to these questions depend upon the good feeling and skill with which the intellectual and moral training of the child is conducted.

LANGUAGE.

One of the most remarkable results of the "association of ideas," is language—spoken and written; and it well deserves special notice. But little progress in civilization could ever have been made by mankind had they not possessed the means of inter-communication and co-operation, as well as of recording their experience. Our ideas constitute our experience; but we cannot communicate our ideas to others directly. We cannot excite ideas in others except through sensations, although we can excite sensations with which ideas are associated. We can utter sounds which others hear, and we can make marks which others see; and, by mutual consent and arrangement, these audible and visible signs may be severally applied to sensations and ideas, and the objects of which we wish to excite the ideas. In different countries, different audible and visible signs have been adopted for the purposes of inter-communication; but the principle of association, by which the signs are connected with the things signified, is the same in all.

In our progress from infancy to manhood, audible signs or spoken language, as a means of communication, precede; visible signs, or written language, follow. The power of merely mechanical reading, so generally prevalent when an ill-directed course of education has been provided, is nothing more than the ready association between the visible signs and audible ideas, the latter leading to the desire and practice of making the corresponding audible signs. The power of really useful reading is the effect of the association, first of the visible signs with the audible ideas, and through these with the ideas of the sensations and objects which may form the subjects written of, accompanied also with the desire and practice of making the corresponding audible signs. After some repetition, the visible signs or words become associated directly with the ideas of the sensations and objects signified. Among the deaf and dumb, the association is formed at once between the visible signs and the ideas of the sensations and objects to which those signs have been affixed. Among the blind, tangible signs, as far as available, are substituted for the visible. In learning a foreign language, the association is first formed between the new signs or foreign words, and the ideas of the old signs or native words. But the foreign language, with its peculiar idioms, cannot be considered as perfectly acquired, till the direct association has been thoroughly established between the foreign words and the ideas of the sensations and objects to which these signs have been affixed by the inhabitants of the foreign land.

Visible signs, or written language, afford the means, not only of communicating with others, but, being of a permanent character, they enable us to record everything that we think will be likely to interest ourselves at a future time, and which might otherwise be lost to us for ever. A succession of written signs, in the shape of a journal, gives us the opportunity to revert, whenever so inclined, to all the past events of our lives. Similar signs in printed books give us the opportunity of learning the events of former times, of profiting by the scientific researches and discoveries of our predecessors, and of obtaining light and direction to guide ourselves in the practice of the arts, and in the performance of the duties of life.

Treatises on grammar and logic are the proper works to refer to for an accurate description of the properties and structure of language. A slight sketch, a mere passing notice, is all that can be expected here.

LANGUAGE—*Names.*

To begin with the process of naming. It may readily be supposed that the names first applied in the infancy of society, as well as learned in the infancy of man, would be the names of objects. Among these would be first such names as man, woman, child, cat, dog, ball, hand, leg, chair, table, spoon, apple, rose, house, garden, tree, with their plurals; and, after an interval, such names as iron, air, gas, oxygen, hydrogen, nitrogen, chlorine, steam, vapour, &c. These words form a portion of the nouns-substantive of grammarians. But the names of objects are not the only names included in this class. These objects excite many sensations; in other words, they have attributes. And these attributes we frequently wish to make the distinct subjects of contemplation.

Thus in the objects above named we may wish to notice specially their quality, such as their colour, their taste, their smell, their density, their strength, their weakness, their elasticity, their playfulness; or their quantity, such as their weight, their magnitude, their length, their breadth, their depth, their circumference, their area; or their relation, such as their superiority and inferiority, their equality and inequality, their succession and coexistence, their likeness and unlikeness, their parentage.

Corresponding to the names of attributes, are the names of our feelings or states of consciousness, many of which are the same as the names of the attributes themselves, as very little observation will show. In addition to many of those already given, among names of sensations and ideas we have heat, coldness, sweetness, softness, brightness; among names of emotions,—pleasure, pain, hope, fear, desire, hunger, thirst, disappointment, approbation, disapprobation, generosity.

In the work of affixing names to the objects, the attributes of objects, and the feelings or states of consciousness which it was wished to denote, the necessity of some contrivance to avoid an inconvenient and unmanageable accumulation of words must soon have made itself felt. It is obvious, nevertheless, that a separate name for each separate nameable subject is not to be dispensed with. In order to construct a larger number of names out of a limited number of words, words that are not nouns-substantive have been adopted. These words are the adjectives of grammarians. Of themselves they denote nothing, but they indicate or connote attributes, whether of objects, of attributes, or of feelings. By means of adjectives, instead of requiring a separate noun-substantive for each subject to be denoted, one noun-substantive coupled with appropriate adjectives will serve to denote many subjects. Thus we say white cat, black cat, tame cat, wild cat, great cat, little cat, pretty cat, ugly cat, dirty cat, clean cat; white man, black man, tall man, short man, amiable man, useful man, active man, lazy man, good man, bad man, &c. So, of colours, we call them bright, dull, vivid, lively, gay, gloomy, light, dark, pleasing; and of characters, we say they are just, cruel, decided, vacillating, weak, cautious, sagacious, reflecting, reckless, dissolute; and of affections, we say they are intense, absorbing, moderate, immoderate, divided, lasting. One more example to show

how many names can be obtained by the use of a limited number of adjectives,—take such a word as white, it can be applied to wall, paper, sheet, face, dog, cat, cow, eagle, fowl, feather, chalk, marble, linen, and many others.

Many other kinds of words besides adjectives have been employed for the same purpose, as well as for making language a pliable and efficacious instrument for communicating and recording our knowledge. Among these are adverbs, prepositions, conjunctions, and pronouns, the uses of which require no particular notice here. The consequence of the use of all these subordinate words is, that of the names contrived to denote objects, attributes of objects, and feelings, a large portion must be many worded, such as "a very learned and excellent man,"—"the thirty-seventh proposition of the first book of Euclid,"—"the patriot who yielded up his life on the scaffold for the benefit of his country."

There are other peculiarities in naming that must not be left altogether unnoticed. Among these is the distinction between individual an general names. With the infant, the nan first learned and applied may all be suppos to be individual; most of them, however, bei destined to expand into general names, that is, into names used to denote successively more than one object, attribute, or feeling. "Man,' for example, is a name denotative not of one man only, but successively of every man in the world. "Colour" also is denotative of every colour; and "Pleasure" is denotative not merely of one emotion, but successively of many emotions. General and individual names have one attribute in common, they both serve to denote the subject to which they are applied; but the general name has another attribute which an individual name has not,—it conveys a meaning whereby its applicability to the subjects successively denoted by it may be recognised. This meaning is what it is said to connote. The distinguishing feature, then, of a general name is that it not only denotes the subject to which it is applied, but connotes also the attributes on account of which it is applied.

Names are also termed concrete or abstract, according as they denote objects or attributes separated or abstracted, as it were, from the objects of which they form a part. Thus man, tree, tall man, well-grown tree, are concrete names; and elasticity, dazzling brightness, soothing influence, are abstract names. Adjectives and similar words, being parts of name only, participate in the attributes of the noun with which they are united to form a denotative name, whether that name be general o individual, concrete or abstract. As migh be expected, a large part of our language in daily use having been framed for us in times of comparative ignorance, many deficiencies, redundancies, and ambiguities in names are to be found to embarrass and confuse us. But to be aware of these causes of difficulty and error is to be already half protected against them; since care in ascertaining the subject denoted, and the attributes connoted, by a name, will effectually save the understanding from being imposed upon by ambiguities of expression.

LANGUAGE—*Propositions.*

The purpose of language, as has been already stated, is to enable us to communicate and record. But names alone do not suffice for this purpose. To sound or write a name, or any number of names, is not to impart any definite information. But when we say "lions roar,"—"the lamb was devoured by the wolf," —"the air is elastic,"—"I love you,"—"you don't love me,"—"the three angles of a triangle are together equal to two right angles,"—"brutes cannot articulate,"—"electricity is the most efficient known agent for rapidity of communication,"—"steam is the most efficient known agent for rapidity of transport,"—we do impart information. We make known to others matters concerning which we have ideas. We affirm or deny something of something; and the assertion is contained in that particular word which answers to the verb of grammarians. Every portion of discourse in which something is affirmed or denied of something, contains a verb, and is called a proposition.

Every proposition consists of three parts,—1st, the name of the thing of which something is affirmed or denied; 2nd, the name of the thing which is affirmed or denied; and 3rd, the mark or sign of affirmation or denial. The thing of which something is affirmed or denied, is called the Subject; the thing affirmed or denied, is called the Predicate; and the mark or sign of affirmation or denial, is called the Copula.

A proposition may be formed with as few as two words. Thus, in "Man articulates," which contains only two words, "Man" is the name of the subject; "to articulate," the name of the predicate; and the inflexion of that verb conveying the affirmation is the copula.

The various inflexions of the verb "to be" are a common form of the copula. As this verb also serves to denote existence, some confusion and error might arise if this ambiguity were to remain unheeded. When we say "a sheep is a quadruped," it seems to be implied, besides, that there is such an animal as a sheep. But we should be in error were we to draw the same inference from the proposition "a centaur is an animal, half horse, half man;" and the proposition "a centaur is a fiction of the poets," if admitted to be true, effectually dispels all thoughts of a centaur's existence. The proposition "there are kangaroos in Australia" has the same meaning as "kangaroos exist in Australia."

The word "not" coupled with the verb, enables us to deny as well as to affirm, leading to the division of propositions into affirmative and negative. By means of other inflexions of the verb, we are able also to assert or predicate in the past and future, as well as in the present time. Examples of such varieties of predication will readily suggest themselves to all readers.

There is a peculiar form of the verb, viz.,—

the infinitive mood, which must not remain altogether unnoticed. The verb in the infinitive mood does not assert. It may then be said to be in its substantive state, and will serve as the name of a subject or of a predicate. Thus, "to take food is to sustain life," —"to administer poison is to take away life," —"to labour is to perform one of the important duties of life,"—"to be idle is to be the object of merited contempt." The sense of these propositions might be so expressed that the propositions should be similar in form to those already given. Thus, "food sustains life,"— "life is destroyed by poison," — "labour is a duty,"—"idleness is contemptible."

Two things are especially to be attended to in all propositions. The first is, that the meaning be clearly expressed, and that the meaning understood is the same as that intended to be conveyed. The subject and predicate are represented by names which may be ambiguous or doubtful in their meaning; and if these names be individual or proper, or the names of simple feelings, the ambiguity can only be cleared up by an appeal to what the names denote; and, if general, the meaning connoted by them must be appealed to. The second is the truth of the propositions, which, if not self-evident, is only to be ascertained by other evidence, the use and properties of which must engage our attention by-and-by. In this place we will only remark, that the material out of which true propositions are constructed is to be gathered from the wide field of knowledge, whatever the variety and character of that knowledge may be determined to be.

There is a class of propositions called "verbal propositions," as contradistinguished from "propositions," properly so called, to which a few words must be devoted. Propositions not merely verbal are the vehicles and records of knowledge. Verbal propositions have to do with the meaning of names. Now, distinctness being a quality that cannot be dispensed with in propositions, and the subject and predicate being represented by names in which ambiguity may reside, we are called upon to inquire what these names connote, and the answers to these inquiries are, "verbal propositions." We may ask, for instance, "what is a triangle?" "what is gold?" "what is water?" These questions may be answered by, "a triangle is a figure with three sides;" "gold is a metal;" "water is a fluid;"—which are verbal propositions, serving to fix or indicate the meaning or connotation of the names of the subjects. When this connotation is completely given, the predicate is called a definition of the subject. When partially given, but accurately enough for the purpose, the predicate is termed a description of the subject. On the other hand, "a triangle is a figure whose three angles are together equal to two right angles," —"gold is soluble in nitro-muriatic acid,"— "water is composed of hydrogen and oxygen, one part of the former to eight parts of the latter;"—are propositions conveying knowledge, the happy results of mathematical and chemical investigation and experiment.

MEMORY.

We have considered language under two points of view; first, as an application of that principle of our nature designated "Association of Ideas;" and, secondly, as an organ for communicating with one another, and recording.

Even the cursory examination which we have attempted cannot but aid our future investigations; since it ought to make us circumspect how and what we speak and write in so employing names and propositions as to make them distinct exponents of the meaning intended to be conveyed. It ought, also, to awaken the reader to the importance of seeing through the signs or words, into the realities with which the words ought to be associated, and which alone give them value.

To revert shortly to what has gone before, —feelings, first sensations, then ideas, seem to be the primary elements out of which our understandings are constituted. The association of our ideas, first with sensations, then with one another, leads us to the recognition of two orders of occurrence in sensations, the successive and synchronous, the order of time and the order of place. From these are formed our complex ideas, in every variety,—of objects, of events, of feelings or states of consciousness, and of the attributes of all these; with the examination of which we shall proceed by-and-by.

In surveying the primary elements of the understanding, and their various combinations, as they present themselves to us, the faculty which seems, first in order, to require consideration, is that of memory.

To have an idea, to be conscious of an idea, or to remember a past sensation or emotion, are all expressions for the same feeling. Ideas simple and complex, as well as trains of ideas, must then form the elements of what we call memory.

If we had no ideas, if we had no other state of consciousness than sensations, we could have no knowledge except of the present. The moment each of our sensations ceased, it would be gone for ever, and we should be as if we had never been. We should have no memory.

But we have ideas, and these ideas are associated first with sensations, and have besides a tendency to suggest one another in the same order as the sensations occurred, of which they are the remembrance. Some of our ideas are also much more abiding than others. There most probably never was the person in whom the idea of every preceding sensation of his life could be recalled. Some people have good and some bad memories, and most people have good memories for some occurrences of their lives, and bad for others.

As memory is a valuable faculty, it will be interesting to ascertain, if possible, what are the circumstances best calculated to give it strength and efficiency. Sensations, whether simple or in clusters, accompanied by emotions of more than ordinary pleasure or pain, or from which we anticipate more than ordinary pleasure or pain, and similar sensations of frequent recurrence, leave behind them ideas more likely to be revived than others. Ideas, also, which are associated with a great number of sensations of frequent recurrence, will themselves also frequently recur. Pleasure and pain, as causes of attention to sensations, and hence of the ready recurrence of the corresponding ideas, are too well known to require illustration. Repetition of sensations, as a means of creating a tendency to the recurrence of ideas, is also generally acknowledged: witness the practice of learning by heart. In learning the first rules of arithmetic, what readiness of memory is acquired by repetition! and where circumstances cause the repetition to be abandoned, what a diminution of readiness is perceptible! Twice 2 is 4, 11 times 11 is 121, 12 times 12 is 144, are repeated by most pupils, one as readily as the others; while 13 times 13 is 169, is repeated with hesitation, because less frequently practised.

But experience has proved that mankind could not safely rely on these aids to memory alone. Other aids are adopted. When there is anything to be done, which it is important should not be left undone, how common is the practice to devise some marked cause of sensation, which, being associated with the required idea, will force the recollection upon it. A memorandum put into his hat to remind a person of what he has to do when he goes out, and a knot in his handkerchief to force upon him the recollection of something to be done in the course of the day, are common examples of these aids to memory. The lawyer's brief suggests the ideas for his pleading; the judge's notes, the ideas for his summing up; the lecturer's heads of subjects, the ideas for his discourse. The merchant's bill-book and the seaman's log-book, what hosts of past events do they not record, suggestive of useful recollections!

An event,—in other words, a cause of sensations similar in kind to two individuals,—will excite two trains of ideas, will give rise to two results of memory, of a very different character in each. A hard frost, for instance, will give rise in one man to the ideas of a former winter spent in Norway, of his sports on the ice, of his sledge excursions, of the companions with whom he enjoyed them, of his encounter with the wolves, of his hilarity, of his return home, and of his pleasure in narrating his adventures to his family and friends; in the other, to ideas of his homeward voyage from Quebec, the snow-storm, the frozen rigging, the unmanageable ship, the sufferings of himself and crew, their shipwreck, their struggles, their distress at the imagined anxiety of their friends, their unexpected rescue, and subsequent restoration to their families and homes.

In each, the memory consists of a train of ideas, of objects, events, and feelings, combined with the consciousness of his self-individuality throughout the whole train. The train of ideas, from the earliest recollection to the present time, constitutes the thread of consciousness by which each man connects his past with his present self.

Cases of forgetfulness, or of want of power to recall ideas, help still further to illustrate what really occurs in cases of memory, or of the instantaneous recurrence of ideas. By frequent repetition, we commit to memory a passage from some favourite author. Years elapse—the passage has ceased to be thought of. An occasion occurs on which we hear the first line—we attempt to repeat the passage—we fail—we can only recall detached words and sentences. The chain of ideas is broken, those links least attended to or dwelt upon originally being dissolved, and the association of ideas being partially destroyed. How often, when at a loss to recall the name of an absent person whose services may be required on account of some present emergency, do we not run over the names of others in whose company we have seen him, till at last the idea of his name also seems to break upon us. There is a story, half ludicrous, half barbarous, of two men, one of whom having stated that anchovies grew upon trees, the other, struck by the absurdity of the statement, naturally contradicted him. The contradiction, being ill received, led to a duel, in which the teller of this strange story shot his antagonist through the heart; and this shot having caused the dying man to leap convulsively into the air, the man of anchovy-trees,—his memory being suddenly corrected by the act of leaping,—cried out, "I beg your pardon, I meant capers."

In cultivating the memory, either by means to fix the attention or by frequency of repetition, care should be taken to direct its efforts to worthy objects. To load the memory with mere words, forms, and frivolities, to the exclusion of more important objects, is a most fatal error, whether in those entrusted with the education of youth, or in persons of mature years, intent on the conduct and improvement of their own understandings. Of this we shall become more sensible as we proceed.

ANTICIPATION.

The next faculty that invites our attention is that of anticipation. As sensation connects us with the present, and memory with the past, so anticipation connects us with the future.

The child first has sensations and emotions, then ideas and trains of ideas, which being associated with the idea of its former sentient self, constitute its memory, and then it anticipates. Among its sensations some are received in the successive order, others in the non-successive or synchronous order; in other words, some occur in the order of time, others in the order of place. Similarity of order is preserved in the memory, and is continued forward by anticipation.

The child enjoys milk, remembers that it did enjoy milk, anticipates that it will enjoy milk. It is delighted at the sight of its mother, remembers that it was delighted, anticipates that it will be delighted at the sight of its mother. It wants food, remembers that it did want food, anticipates that it will want food. It feels pain from a blow, remembers that it did, and anticipates that it will feel pain from a blow. The sight of a rose is accompanied by an agreeable smell, the child remembers that it was, and anticipates that it will be so accompanied. It sees night follow day, remembers that it did, and anticipates that it will follow day.

In like manner, the well-trained youth, associating the past and present together, feels that by attention and application he has made himself acquainted with much useful knowledge, and anticipates that by persevering in such attention and application he will make himself acquainted with more.

And so it is with all mankind. They have ploughed and sown, and afterwards they have reaped; they have built and navigated ships, and have arrived at distant parts of the globe; they have constructed railways, built locomotives, contrived electrical telegraphs, and have transported themselves, and communicated their tidings and wishes with certainty and rapidity, and they anticipate that like antecedents will be followed by like consequents.

The faculties of sensation and memory, if not accompanied by the faculty of anticipation, would not be the guide which they are to us for the future. But having the faculty of anticipation, the past and the present constitute not only our experience but our guidance ; and according to our accuracy in reading the past and present will be our sagacity in reading the future. History teaches us, however, that man's so-called experience has hitherto been not unfrequently a very mistaken experience. He has misinterpreted his sensations, and consequently his memory has supplied him with distorted appearances, both of objects and events. But distorted as these appearances are seen to be by others, in him they guide anticipation as thoroughly as would the most correctly interpreted sensations ; not otherwise than buoys or beacons, which equally guide the mariner, correctly or incorrectly interpreted, but in one case to his destination, and in the other to his destruction.

There is a feature in man's past experience, in his recorded history, which must not be passed over in silence ; and that is, the frequency with which his previous errors and oversights have been forced upon his notice—his errors in assuming antecedent and consequent, when there was no such order—his oversights in failing to observe antecedent and consequent, when that order did exist. The history of every science is nothing but a succession of such errors corrected, and such oversights supplied. This succession of correction and discovery becomes of itself part of that recorded chain of antecedent and consequent, which, by means of anticipation, is to be our guide for the future.

Man's anticipation of the future, then, is his knowledge of the past and present, or what he deems that knowledge to be, qualified by that portion of his experience which has so often made him conscious of his manifold mistakes and oversights. He never seems to hesitate in anticipating that future antecedents and consequents will be similar to the past; his difficulty is to ascertain with certainty, to convince himself what those past antecedents and consequents are. When he has gained a satisfactory insight into the past and present, he has also formed confident anticipations of the future.

The nautical almanac furnishes us with an admirable illustration of the firm reliance with which man anticipates that the course of the future will be uniform with the course of the past, when once he has succeeded in tracing the succession of antecedent and consequent which constitutes the course of the past. This almanac is prepared four years in advance, to meet the wants of navigators who are about to proceed on long voyages. It gives the positions of the moon and planets for every day in the year, and the times of transits, eclipses, and occultations; and, if sufficient inducements were given, the calculators of the tables in this almanac would furnish similar information twenty years in advance. They would furnish it with undiminished confidence 7,300 days in advance; and nobody can show that calculations on the same principles would not give equally correct information 7,300 years in advance.

This same almanac contains no announcement of—what would be an equally interesting matter to be known—the future state of the weather, because man has not yet been able to trace in the alternations of the weather any regular chain of antecedent and consequent. While, therefore, the movements of the heavenly bodies, in which the chain of antecedent and consequent has been traced, are the subjects of confident anticipation, the alternations of weather, in which the chain of antecedent and consequent has not been traced, are involved in obscurity.

VOLITION.

Sensations, ideas, and the association of ideas, memory, and anticipation, may then, so far, be considered as the constituents, so to say, of the understanding, following one another in the order stated; each antecedent being independent of its consequent, and each consequent, although dependent upon its antecedent, involving something besides. But there is yet another of our faculties, Volition, which also claims to be one of the constituents of the understanding.

The infant soon after its birth begins to move its various muscles; but some time elapses before there is anything to indicate command, guidance, or volition on its part. Its first movements have been termed automatic. At length, the hand is stretched out to grasp a desired object; the head is averted from the object of dislike; the legs and feet convey it towards the object of attachment, and away from the object of fear. These acts of the child are followed by ideas of acts. It remembers that it did act, and how it acted—

how it succeeded in doing what it wanted, and when it failed; and its growing experience leads it from the memory of the past to anticipate what success it is likely to meet with in its future attempts. Volition, then, with its consequences, may be said to be excited in every case by sensations or ideas combined with the anticipation of desired results.

A lad whose education has been tolerably well conducted, whose trains of ideas have been formed in accordance with the realities of life, knows that he must labour to earn the means of livelihood, that his efforts of labour must be guided by knowledge, and that the produce of his labour must be husbanded with care, and enjoyed with discretion. Sensible of all this, he wills to avail himself of the assistance of his instructor to acquire knowledge, and to form habits of application and self-restraint. And every successful effort of volition encourages him to persevere in the same track.

The well developed man, surrounded with every comfort that industry, knowledge, and economy can procure, feels that he is happy, remembers that he has laboured, and learned, and saved to procure what he now enjoys, anticipates that similar comforts are only to be procured by like means, and wills to persevere in a course of labouring, learning, and refraining.

A merchant receives and reads a letter from his correspondent at New York (*sensations, and consequent train of ideas*)—the letter contains tidings of imminent losses, which may be prevented by his immediate presence (*anticipation* of ruin or privation, which he may avert by decision of conduct),—he takes his passage, and shortly afterwards embarks by the earliest conveyance (*volition, and consequent action*).

The antecedents of volition have obtained the name of motives. The motives which influence different individuals, and the direction in which the same motive will urge them, vary according to the trains of ideas predominant in each; in other words, according to character, position, and expectations. But in all there prevails this similarity, that the volitions and acts consequent upon them will be determined by the estimate or anticipation of the good or pleasure to be secured, or of the evil or pain to be avoided.

The distinction between voluntary and involuntary action is familiar to everybody. But in what does it consist? One of the earliest efforts in infant-training, is to induce self-control over some apparently automatic motions, in other words, to keep them under command—to make them subject to volition. The acts, however, of full-grown men, as well as of children, which are not subject to volition are of every-day occurrence: such acts, for instance, as sneezing, coughing, yawning, laughing, sighing, and weeping,—the two former being preceded by peculiar sensations; the antecedents of the others being either sensations or ideas. The reading of a letter, or the sight of a particular object, may excite yawning, laughter, sighs, tears, or may cause the slower or faster beating of the heart. Involuntary acts, therefore, so far resemble voluntary acts in having sensations and ideas as necessary antecedents; but voluntary acts must be preceded, besides, by anticipation.

In volition, and the acts consequent on it, sometimes the volition extends only to the immediate act, not to the consequences of that act: indeed, consequences very different may have been willed. A special name, intention, has been given to the volition of the consequences of acts. A man fires off a gun for his amusement. Unwittingly he kills his neighbour's dog. He wills to fire, but did not will or intend to kill the dog. He administers a drug to cure his child. His child is poisoned. He wills to administer the drug, and wills or intends to save his child's life, but did not will or intend to poison it. He sees his friend in a fit. He lifts him in his arms, carries him to the pump, and restores him to animation. In this case he wills the act, and wills or intends the consequences of it.

Acts and their consequences, means and ends,—which are both known to have been willed in the first instance,—have, by repetition, a tendency to assume,—sometimes the one, sometimes the other—an appearance of being involuntary. The movements of the muscles, to balance itself in standing and walking, are willed by the child, but seem to be automatic or involuntary in the man, who is only conscious of willing the end. The movements of the fingers in writing or playing on an instrument, which are willed so steadily by the learner, are executed almost unconsciously by the accomplished scholar, who seems only to will the full effect of the communication to be made, or the music to be executed. On the other hand, the man of business, who, in his youth, engaged in a laborious profession for the purpose of securing a competence for himself and his dependants in his old age, forgetting the end, and allowing himself to be wholly absorbed in the means, continues to will the means alone, without reference to the end, and degenerates into a greedy and selfish miser.

In that complex state of feeling which gives rise to volition, there is yet to be noticed a peculiarity; the desire which we are apt to feel, to do what others are doing around us. The acts of others in whose society we habitually live, seem to exercise a kind of contagious influence over our wills. We first desire, then will to imitate them. This tendency is peculiarly observable among the young. The old proverb, "Evil communication corrupts good morals," or its counterpart, which is much to be preferred, "Good communication corrects bad and confirms good morals," seems to be partly founded on this oft-observed tendency to imitation which prevails among mankind. It may be doubted, however, whether the potency of this readiness to imitate has been yet half-acknowledged, or half-turned to account in the grand business of education.

KNOWLEDGE.

Before attempting any further elucidation of the faculties of the understanding, or following them into their more complex developments, it will be useful to make something like a survey of what these faculties have to work upon: it will be useful to have something like a picture before us of what may be supposed to have been man's progress in the acquisition of knowledge, and what his prospects are in reference to further acquisitions. Such a survey, defective as it must be in arrangement, will, nevertheless, comprise a tolerable enumeration of understandable subjects, which, of course, include all that is called knowledge, as well what is knowable, although not yet known, as what is already known.

The motives which have in all times urged man on to inquire and learn are obvious enough. He has felt hunger and thirst, cold, heat, and damp. He has been preyed upon by wild beasts and by his fellow-man. He has, in short, found himself exposed to pain in every shape, and has feared similar suffering in future. And, lastly, he has learned that this future suffering may be averted or alleviated by his own will and acts, if he only make himself acquainted with the best means of directing his will and acts—that is, his exertions. The repetition of such ideas and anticipations from the remotest period recorded in history,—the experience accumulated in past ages of the benefit derived from every accession to our knowledge, added to the experience gained in our own times, is what encourages us to persevere in the course of accurate observation and experiment, and also stimulates us to the attainment of aptitude and skill to turn the results of our experience to account.

To satisfy our wants and gratify our tastes and inclinations — to avert pain and secure enjoyment—two things seem to be essentially requisite, viz., knowledge to guide and skill to execute—science and art, theory and practice. It might be said, and very properly too, —if the matter to be urged were not provided for in the conjoint operations of science and art,—that besides knowledge and skill, good habits are also requisite to enable man successfully to ward off future pain and provide for future enjoyment. But a very little reflection must satisfy everybody that science and art, in the extended signification here allotted to them, would not overlook this department of useful knowledge; since science would teach what habits are good and what bad, which habits tend to increase, which to diminish the happiness as well of society as of the individual, and what methods are best calculated to implant such habits as have been decided to be good. And the art corresponding to the science would so employ the knowledge which the science expounded, as to secure the formation of the habits recommended.

Let us now proceed, as briefly as possible, with our survey of the detached fragments of knowledge—of the rudiments of science and art, in the order in which they may be supposed to have forced themselves upon the attention of mankind.

The desire of providing against hunger and thirst has led to hunting and fishing, to the breeding and feeding of cattle, to agriculture and horticulture; which, again, have led to the observation of the habits of animals, the qualities of plants, the varieties of seasons, the efficacy of implements, and the composition of soils.

The desire of providing against the inclemency of the weather has led to the making of clothes, the building of houses, the manufacture of glass, the smelting of ores, and the excavation of coals; which, again, have led to the observation of conducting and non-conducting substances, of simple and compound bodies, and of their relative tenacity, ductility, elasticity, durability, and combustibility.

The desire of adding to the productive power of labour has led to the contriving of levers, wheels and wedges, cranes and presses, wind and water mills, and steam engines; which, again, have led to the observation of the properties of air, steam and fluids, and of the direction and composition of mechanical forces.

The desire of gratifying curiosity and procuring additional articles of food, clothing, and luxury, has led to the exploring of the entire surface of the globe, to the constructing of carriages, locomotives, and railroads, to the building, propelling, and guiding of ships, and to mercantile intercourse; which, again, have led to the observation of the size, shape, and movements of the earth and of all the heavenly bodies, of the properties of the needle, of the flux and reflux of the tide, and of the weight of the air and its variations.

The desire of giving increased efficacy to all the above efforts, by suggestion, arrangement, and co-operation, has led to the making of chronometers, thermometers, barometers, sextants, telescopes, and theodolites, to the fixing of standards of weight and measure, and to the building of observatories; which, again, have led to the observation of the pendulum, of the expansion and contraction of metals, of the diffusion of light and electricity, and of the pressure of the atmosphere.

The desire of preserving and restoring health has led to medicine and surgery; which, again, have led to the observation of the sanative influence of vegetables, minerals, air, temperature, and change of diet and employment; of the precise structure of the human frame, of the symptoms of healthy and diseased action, as well as of the presence of noxious gases, and other more recondite influences.

The desire of securing the blessings resulting from the accumulated savings of previous labour, as well as of being protected from violence and spoliation, has led to the organization of government—legislative, judicial, and administrative; which, again, has necessitated the observation of the conduct and actions of human beings, as well in their social as individual capacity, and of the motives to action which so urgently require to be weighed and estimated.

The desire of providing for the comfort and happiness of our children, and of making sure that the knowledge and good habits which we possess should be handed down to them, with the disposition to improve, and afterwards pass their improvements on to their descendants, has led to the practice of training and teaching; and, as subsidiary to this, to the examining into the characteristics of the being to be educated, and of the influences to be employed, so as to pursue such methods as are best calculated to realize the object in view.

Lastly, the desire of retaining all the experience that has been gained, of communicating and co-operating, has led to the adoption and gradual enlargement of language, and to the contrivances of writing and printing. Of language it may safely be said, that, as a subordinate means of promoting improvement, its importance can scarcely be over estimated, although, if magnified into undue proportions, and made to assume the appearance of being what it is not, all knowledge, waste of time, and misapplication of means, the most lamentable, cannot but be the consequence.

What has been said of fire is equally applicable to language,—it is a most valuable servant, but a most dangerous master. Let us, therefore, always welcome language as the servant—the most valuable servant—of knowledge, but nothing more.

CAUSE AND EFFECT.

The contemplation of this large and growing mass of knowledge excites in us, as it has so often excited in others, the desire to ascertain if there be any recognisable chain which binds together some or all of the many parts of which it consists, and into which it has been—sometimes usefully, sometimes capriciously—divided.

The two orders in which our sensations occur, have already been adverted to—the successive, and the non-successive or synchronous; the former constituting the distinguishing feature in what we call our knowledge of events; and the other, the distinguishing feature in what we call our knowledge of objects.

The order of succession need only to be mentioned in connexion with knowledge, with science and art, or, in more familiar language, with the never-ceasing business of life, to be acknowledged as all pervading. Day follows night; spring, summer, autumn, and winter follow one another; death follows life; calm, gale, hurricane, rain and sunshine follow one another; health and sickness, scarcity and abundance, vegetation and decay, ploughing, sowing and reaping follow one another; civilization succeeds to barbarism, wealth to poverty, power to weakness, discipline, order, and regularity to anarchy and disorder.

The biography of the individual, as well as the history of man, is a succession of successions. Many of these successions pass along unheeded, but others have engaged and riveted our attention, and been the subjects of our tudy and examination. There are some things, for instance, which have been found to be indispensable to the security and comfort of our existence. Let us select, as one of these, "the store of food adequate to meet our wants till a further supply can be obtained." It is a matter of intense interest to ascertain how this store is to be provided. Harvests already gathered must be sheltered and protected. How are these harvests to be procured? The earth must be tilled. How is the earth to be tilled? Knowledge must be gained, skill must be acquired, labour must be applied. Here, then, we have a thing or consequent required, and the means or antecedents to lead to this consequent.

The history of the universe, as far as known to man, is also a succession of successions. Many of the phenomena which form the component parts of these successions are subjects of absorbing interest and curiosity. For example, "the alternate recurrence of day and night:" by what is this occasioned? By the rotation of the earth on its axis while exposed to the influence of the sun. "The successive recurrence of the seasons:" by what is this occasioned? By the obliquity of the earth's axis to the plane of its orbit. "The flux and reflux of the tides:" what are they produced by? The varying position of the moon as regards the different portions of the earth. Such are the answers that have been given to these questions. Upon what are these answers founded?

The long and steady contemplation of phenomena has led mankind by slow steps, first to observe the order of antecedent and consequent; subsequently, out of a host of antecedents, to select that one or more without which the consequent phenomenon, the special object of attention, would not exist. Consequents which have been observed to be indissolubly attached to certain antecedents have been specially named. So also have antecedents which, separately or in combination, have been observed to be indissolubly attached to certain consequents.

A consequent or consequents which *must* be preceded by a certain antecedent or antecedents, is called an effect or effects. And the antecedent or antecedents which *must* be followed by a certain consequent or consequents, is called a cause or causes. The connexion so established being called the connexion of cause and effect.

It must be left to the reflecting reader to provide himself, out of the results of his own study and observation, with what additional illustration he may require of the success with which man has brought to light, by dint of accurate investigation and experiment, from among all recorded antecedents and consequents, those which, by their mutual dependence, are entitled to be considered as causes and effects.

One great feature, perhaps the most distinguishing feature, of man's progress in civilization, is the growing tendency and disposition in our own times, to search out, on all occasions, and accurately to trace, the connexion of cause and effect. The advantages which have resulted from prior investigation encourage to perseverance, and each revolving year reveals to our understanding new links of that continuous though once invisible chain of cause and effect which binds age to age, and connects our planet with the universe.

Events and phenomena which were long thought not to be within man's powers of research have, by the continued application of sagacity and experiment, been connected with their causes; and similar means are in daily operation to discover the causes of other events, whether for the purpose of guarding against or producing those events. Thus we have inquiries into the causes of storms, of the fertility of soils, of the potato-rot, of accidents and crimes, of health and sickness.

In tracing the connexion of cause and effect, inquirers have not confined themselves to the process of investigating backwards from events to their causes; they have been equally diligent in the investigation from causes onward to effects. The investigation of the causes of thunder and lightning brought to light several of the phenomena of electricity; and the investigation of the effects of electricity in connexion with magnetism, has led to one of the latest and most useful triumphs of human sagacity and industry — the electrical telegraph.

There is another remark, of some importance, which must not be omitted. In tracing the connexion of cause and effect, it would be a great mistake—one quite at variance with our experience—to expect to trace each event to some one cause. In general, an event is produced by a concurrence of causes. As people in the lowest depths of ignorance seldom revert at all from events to their causes, so the little and ill-informed are seldom on the look-out for more than one cause of an event, and even are not very nice in adopting the first fictitious one which the prevailing superstition will present to them.

Let us suppose the subject of inquiry to be the loss of a ship. Here the effect is known; the cause, or causes, to be traced. "She was fated," says the man of no-thought, who shelters his no-knowledge under the verbal form of an affirmative answer. "She sailed on an unlucky day;" or, "there was a coffin on board;" or, "there was no horse-shoe nailed to the mast;" or, "a witch looked at her with an evil eye;" or, "she was overloaded;" or, "she was ill-found, or short manned," says the man of misdirected or little thought. While the man of much thought finds that her loss was occasioned by a concurrence of causes, such as the state of the weather, the weight of the cargo, the defect of original construction and the age of the vessel, the weakness of the crew, and the want of skill in the master,—any one of which causes being absent, the loss might not have occurred.

Let us next select, as a subject of inquiry, the state of the weather on some future day. In this case, the event is to be anticipated by ferreting out the causes from among all antecedent events. "It will rain," says the man of no-thought, "because it always rains on that particular day of the week, or because my almanac says that it will." "It will rain," says the man of little thought, "because there will be a new moon at a certain hour, or because the barometer is indicating *rain*." "I don't know," says the cautious inquirer; "I have not yet been able to ascertain what antecedents necessarily precede any definite kind of weather. I have observed every variety of weather, with every state of the barometer, and different characters of weather at the same time, in places not very distant from one another. I have been able to trace a connexion between the state of the tide and the position of the moon, but no connexion between the state of the weather and the position of the moon. I am prosecuting my inquiries into electrical phenomena, the upper and lower currents of the atmosphere, and other phenomena, and do not despair of being able to ascertain some inseparable succession of consequent to antecedent; but, for the present, I must confess my ignorance, and hold my judgment in suspense on the causes of the weather."

When a long train of events is presented to us, out of which to select such as are connected together as cause and effect, we are frequently in the habit of leaping from one part of the train to another, skipping intermediate links, and fixing upon those particular events which are the special objects of interest to us. Also, where a concurrence of causes produces an effect, it is not an uncommon practice to select from among them one prominent event, which is called *the* cause. As an instance in which both of these practices may be observed; man's labour is said to be the cause of wealth; but it need not be shown that man's labour must first produce many intermediate effects before wealth can be produced; and man's labour is only one of many concurrent causes necessary to produce that effect, since man's labour in the Arctic and Antarctic regions, or in the deserts of Arabia, could scarcely be followed by wealth. Also, when we say, in familiar language, that the rotation of the earth on its axis is the cause of the succession of day and night, it is not pretended that we could dispense with the sun, or with the transparency of the medium through which the rays of the sun have to penetrate before they can reach us.

In this same spirit we speak of objects as the causes of our sensations. There are two concurrent classes of antecedents to our sensations —one of those involved in our organization, and the other of those which constitute external objects. That the first are essential is indisputable; for the blind, and the deaf and dumb, by being deprived of those causes of sensation, are also deprived of the sensations of which those senses are the partial causes. That the second are essential is no less indisputable; for let objects be withdrawn, and the corresponding sensations cease. To have the smell, the taste, the touch, or the sight of an apple, the apple must be present to our senses. But although this concurrence of causes is essential to the effect of sensation, the cause involved in our organization is passed by in silence, and the object, as the thing which engages all our attention, is spoken of as the cause of our sensations. Our own experience, corroborated as it is by the experience of everybody else, and being perfectly uniform, leads us to consider external objects, and the sensations consequent upon them, as among the most striking examples of cause and effect to be met with in the whole range of our knowledge.

To establish the connexion of cause and effect, then, some such process as the following would appear to take place. First, we observe the succession of antecedent and consequent. Secondly, among all antecedents and their consequents, we select those which are indissolubly connected, that is, those in which, if the antecedent be removed, the consequent must also be removed, and *vice versâ*. Lastly, by the faculty of anticipation, we feel that when we have satisfactorily established the connexion of cause and effect in the past, that connexion will continue into the future. Thus, not to depart from our last illustration, objects were the causes of our sensations, are the causes of our sensations, and will be the causes of our sensations; or, in one word, must be the causes of our sensations.

OBSERVATION AND EXPERIMENT.

Dependent as we are upon our senses for all the knowledge which we possess; liable as the history of our race and our own experience shew us we always have been, and still are, to misinterpret our sensations; mistaken, in consequence, as we so frequently are in our anticipations, and in the regulation of our conduct and actions; it is evident that our first efforts in the training of the young, and in self-improvement, should be so to exercise the senses as to make them the medium of conveying correct, not distorted, representations of objects. Then, progressively, as we shall have succeeded in these efforts, we should strive to acquire equally correct knowledge of the orders of succession and co-existence; and, lastly, from among all observed antecedents and consequents, to select those which are inseparably united, and deserve, accordingly, to be so registered in our understandings, under the descriptive title of "cause and effect."

Habits of observation, the power of directing our efforts judiciously, of checking and verifying the announcements of one sense by the announcements of others, are, as is well known, the fundamental requisites of accurate knowledge. Not only to our own observations, but also to the accumulated observations of past times, are we indebted for our acquaintance with all the phenomena and objects which have been made available for increasing human happiness. It has been found, however, that comparatively but little progress could be made in acquiring a correct and complete knowledge of the phenomena of the universe, by a mere passive observation of them. An active observation, or investigation by means of experiment, has contributed largely, and is daily contributing more, to our previous information. Nor must we forget to mention the many mechanical contrivances which have been adopted to aid our efforts both of observation and experiment.

To give a striking, although still an inadequate notion of what has been gained by the ever-growing practice of experimental investigation, let us contrast the four elements of the ancients—air, water, earth, and fire, with the numerous bodies provisionally classed as elementary by modern chemists,—provisionally, because experimental investigators, who have so often found their labours rewarded with success, have learned to be cautious in their decisions. An elementary body, with them, means a body that has not yet been decompounded; it does not mean one that cannot be decompounded.

Air has been decomposed into oxygen and azote, water into oxygen and hydrogen, while it would be difficult to enumerate the elementary bodies and their various combinations, that have been discovered among what the ancients called—earth. Their other element, fire, is purely imaginary, fire or flame being the effect resulting from the combination of two or more bodies, or from electricity.

Successful as experiment has been in decomposing the objects which commonly present themselves to our senses, it has been no less successful in forming a union of two or more elementary bodies into compound bodies—some similar to those already observed, and some previously unknown. Thus iron-rust has been decomposed into oxygen gas and iron, and these two elementary bodies have been again combined so as to form iron-rust or oxide of iron. Charcoal, sulphur, and saltpetre, can all be separated from the foreign substances with which they are united, and then brought together so as to form that well-known compound, gunpowder, that powerful agent to produce, or, which means the same thing, that cause to effect results required for our daily use and convenience. Chlorine, which chemists have contrived to separate from common salt, has, by its property of destroying vegetable colour, enabled the paper-manufacturer to use coloured as well as white rags for the purpose of supplying us with the white paper, now so greatly in demand, and such an efficient instrument of human improvement and enjoyment.

One more illustration, drawn from another class of phenomena, must suffice to indicate the variety as well as the extent of the advantages which have been gained by observation and experiment. When an object is close to us, the sensations of sight and sound derived from it seem to be simultaneous. Removed to a little distance, we have the sensation of sight first, that of sound afterwards. The flash from the distant gun reaches our eyes before the report reaches our ears. After repeated observations and experiments it has been ascertained that sound travels at the rate of nearly one-quarter of a mile in a second, while light travels at the rate of 192,000 miles in a second.

Light from an object, distant only a few miles, may be said to reach us instantaneously. The distance of thunder can thus be estimated by the number of seconds which elapse between the flash and the report.

It need scarcely be added, that besides the habit of accurate observation, manipulative dexterity in conducting experimental inquiry must be a valuable acquirement, particularly fascinating to the young, stimulating to the desire to interrogate nature, and helping to the ability to interpret her answers. The founding of institutions which shall provide contrivances and arrangements specially adapted to call forth the combined powers of observation and experiment, as a branch of general education, is, unfortunately for the present generation, among the duties bequeathed to posterity.

INDUCTION.

When considerable acquisitions in knowledge have been realised, it would be a great hindrance to further progress, if they could not be thrown into such order, and so concentrated and registered in the understanding, as to be readily available to be used as advanced posts, whence to push forward to new discoveries. In the ordinary pursuits of industry, as is well known, whether agricultural, manufacturing, or commercial, and in all our domestic management, arrangements have been made, and methods adopted in compliance with established knowledge, and on the assumption that they are conformable to bygone experiment and observation. And it is obvious that the works essential to our very existence could not proceed, if reliance were not placed on the recommendations which have been handed down to us to be acted upon, at all events, till something better can be substituted.

For the sake, then, of dispatch and readiness of application, whether for the daily purposes of life, or as advanced posts whence to push forward to further acquirements, a large stock of well-authenticated combinations, uniformities, and connexions of cause and effect, which may be relied upon with confidence, must evidently be a desirable acquisition. To obtain such, every possible precaution must be used to guard against misapprehension; and the rules to be observed for this purpose would naturally be themselves the subject of anxious examination. Rules to this end are known as the rules of Induction. They furnish us with such instruction and cautions as will enable us to satisfy ourselves that supposed general uniformities, or, as they are sometimes called, laws, really deserve that title, and are what may be safely depended upon for our future guidance.

While we have been indebted to attentive observers, and experimental inquirers, for the knowledge which we possess of so many phenomena and uniformities, the knowledge of others has, as it were, been stumbled upon when little expected. Bold conjectures have also been hazarded, by sagacious speculators, on the laws which may be supposed to link together phenomena apparently unconnected or discordant. And spurious appearances of cause and effect have been received as valuable accessions to our stock of knowledge. The business of induction is to supply tests and rules by which all supposed uniformities and phenomena may be examined, and those which deserve to be classed among general laws may be separated for our use and information.

That the framing of the rules of induction is a work of nicety and discrimination, must be apparent to everybody who has given even but little thought to the subject. Let the causes of any phenomenon be what we are in search of—

they may be so concealed and interwoven among other antecedents, as long to elude the most vigilant observer, or the most cautious investigator. Thus, accompanying, although really unconnected antecedents, may be mistaken for the causes, or for part of the causes. Other antecedents, again, also closely connected, but not so immediately obvious, may be concurrent causes, or causes acting wholly or partly in a different direction. It is the province of induction so to direct our observations and experiments that we may be prepared for all these contingencies.

A reference to some of the now universally received general laws, while yet mixed up with the apparent complication out of which they have been extricated, will serve to elucidate the use of the suggestions and cautions presented to us in the rules of induction.

The laws of gravitation are, that every particle or atom of matter attracts every other atom; that this attraction is proportional to the masses of the attracting bodies, and inversely proportional to the squares of their distances. But these laws have been evolved from among a mass of phenomena, seemingly inconsistent with any uniformities, such as are indicated by these laws. Two bodies of different specific gravities dropped from a height, reach the ground at different times—how can this be reconciled with the above laws? The answer is, remove the intervention of the air, and both bodies will fall at the same time. This experiment has been tried in the exhausted receiver of an air pump, and a lump of lead and a feather have been found to fall together. Of two bodies also liberated at the same time, one will fall to the earth, and the other rise from the earth. But here again the specific gravity of one is greater than that of the surrounding atmosphere, while that of the other is less; and the atmosphere itself is subject to the laws of gravitation, in common with all other bodies. In obedience, therefore, to these laws, and to other laws peculiar to aëriform bodies, the atmosphere, in pressing down, presses up from the earth the body which is lighter than itself.

The laws of gravitation are only a portion of the laws of attraction, which comprehend, besides, the laws of cohesion, of capillary attraction, of electric or magnetic attraction, and of chemical attraction or affinity. These latter laws sometimes operate in conjunction, and sometimes in opposition to the laws of gravitation, producing complex effects, the tracing of which, up to their several causes, in conformity with the rules of induction, has been the labour of ages of observation, experiment, and calculation.

Among the laws of heat is this—that in proportion as it pervades bodies, it increases the mutual distance of their constituent atoms, or causes them to occupy a greater space. A rod of iron, for instance, when heated, becomes longer and wider; when further heated, it will become liquid; and when still further heated, it will assume the aëriform state. Carbonic acid gas, when forced to part with a certain portion of its heat, assumes the liquid form, and when forced to part with another certain portion still greater, it becomes a solid. This law of the expansion of bodies in proportion to the quantity of heat which pervades them, is met by an opposing law, when the bodies are about to change their physical or chemical states. Thus water near the freezing point will expand when the temperature is reduced sufficiently to make it assume the form of ice. The knowledge of these laws is the result of the most patient and varied experimental observation, of the closest attention to the rules of induction, and also of frequently repeated verification. That the greater or less quantity of heat, in combination with some bodies, will cause them to assume the form of vapour, of liquid and of solid, has long been familiar to the dwellers in cold climates, but no doubt many of the inhabitants of tropical climates are quite unconscious to the present day, that water and oil can assume the solid form. It is only in our own times, however, that the laws of heat have assumed the comprehensive form which they now hold in the understandings of all scientific men.

Among the laws of fluids, elastic and non-elastic, is this—that they press with equal force in every direction. Elastic fluids, as gas, pervade all bodies more or less. The elasticity of the air in our bodies counterbalances the pressure of the external air, which is equal to fifteen lbs. on every square inch, so that when this pressure is removed by a cupping glass or any other artificial contrivance, expansion of the part from which the pressure is removed, is the consequence. Animal and vegetable substances are so well able to resist the pressure of the atmosphere to which they are unceasingly subjected, that this pressure is still unknown to the great mass of mankind. The elasticity of the air in the barrel of the pump, is sufficient to prevent the rise of the water into it, although the whole weight of the atmosphere is pressing on the water in the well outside the barrel. When a few lifts of the bucket have removed the elastic air in the barrel, the water, as is well known, then rises in the barrel.

These illustrations, incomplete and cursory as they are, will suffice, it is hoped, to render intelligible what is meant by "general laws," and to shew the necessity of rules of induction, that is, of rules by which observation, experiment, and calculation must be guided, if it be wished to establish laws which can be relied upon. For the rules themselves, works specially devoted to the subject must be consulted.

DEDUCTION.

Having, by carefully conducted observation and experiment, made ourselves acquainted with the attributes, both as regards quality and quantity, of certain objects, and with their relation to one another, in the order both of time and of place, it becomes a subject of deep interest to ascertain whether any other truths, not at first sight apparent, are necessarily involved in what we have so far succeeded in establishing — whether we have reaped the full harvest of knowledge from that which observation and experiment have placed at our disposal.

The enlargement of our stock of knowledge from these sources, is promoted by two principal methods, the inductive, which has been already noticed, and the deductive, to which our attention is now to be directed. They are employed, in conjunction, with advantage. The first brings the grist to the mill, the second grinds it. The first weaves the cloth, the second cuts it into shape, and adapts it to our use. The first brings to us all our materials in every form and order, the second extracts and unfolds from them whatever of the good and useful might otherwise lie dormant and unobserved.

The data from which we start in our deductions, reasonings, or demonstrations (for all these terms may be employed indiscriminately) are the results of induction, whether those results be so simple and obvious as to be often regarded as intuitive truths, or so complex and removed from ordinary apprehension as that their discovery should have been universally considered as epochs in the progress of mankind. These data, in their various forms, are admissions of the existence of objects as they are made known to us through our senses, of their qualities, quantities, and relations, couched in the form sometimes of postulates and axioms, at other times of general laws. As by inductive methods we certify these data to ourselves, so by deductive methods we realize to ourselves all the subordinate truths or laws which are involved in them; and which truths, on account of the methods by which they are obtained, have been termed necessary truths: although it must be obvious that no derivative truth can have any certainty in it, greater than that which is contained in the truth from which it is derived. The truth of any proposition being granted, the process of deduction is to discover, by a series of happily devised expedients, what other truths lying hid, although useful to be known, may be evolved from it.

Our first examples of what has been achieved by the deductive method, shall be drawn from the science of mathematics. All who are acquainted with the merest elements of this science, know that the square described on the side of a right angled triangle, opposite to the right angle, is equal to the sum of the squares described on the two sides which contain the right angle. Although that property of a right angled triangle might have remained concealed for ages, it is quite clear, now that it has been revealed to us by deduction, that it would be impossible to describe a right angled triangle of which that must not necessarily be a property. More than one ingenious mathematical puzzle has been contrived by which the truth of the deduction may be verified by superposition.

As another example, the ratio of the diameter of a circle to its circumference, is as 1 to 3·1415...to any number of places of decimals, according to the degree of accuracy required. When once the requisite ingenuity had, link by link, completed the chain of deductive proof, it was seen that no circle could be described of which this ratio of the diameter to the circumference is not true. An approximate verification of its truth may be obtained by straightening a circular piece of wire, and comparing it with the diameter of the circle of which it formed the circumference.

The valuable deductions of trigonometry are themselves principally deduced from this known relationship of similar triangles, that "the sides about the equal angles of equiangular triangles are proportionals;" this relationship being itself established by a long train of deductions from inductions the most obvious; while the results of the trigonometrical deductions are of the utmost importance in human affairs, and are the subjects of daily verification.

As long as our deductions have to be drawn from a few simple truths, or inductions of one kind, as of quantity, arithmetical, algebraical, or geometrical, nothing can intervene to disturb the certainty of our conclusions. But the deductions which the indulgence of our desire for further knowledge, and the supply of our wants, lead us to undertake, are seldom of so unmixed a character. We have to make them from many concurrent laws, acting sometimes in the same, and sometimes in opposite directions.

The sciences which present themselves next in order are those which are much interwoven with the laws of quantity. They also afford striking evidence of what may be achieved by the deductive method. Astronomy, or the laws of the stars, is a collection of deductions from certain recognized phenomena, and from the laws of motion combined with the laws of quantity; the results of these deductions being constantly verified by observations, aided by instruments themselves contrived by the aid of the deductions of other sciences.

One of the sciences which has been specially called to the aid of astronomy, to supply it with data, and to verify its deductions, is optics,—itself a collection of laws deduced from the laws of quantity, combined with the laws of light, and with what has been observed of the qualities of different media through which light is transmitted, giving rise to the subordinate deductions of refraction and reflection; and in conformity with which laws, all nautical instruments, to be of any use, must be constructed. The laws of quantity, in conjunction with other general laws and recognized phenomena, give rise, besides, to the deductions of mechanics, hydrostatics, pneumatics, acoustics, and other sciences.

Proceeding from these sciences to others, in which it is necessary to make deductions from a still greater variety of inductions, both in kind and number, we find our difficulties on the increase. Not only is our knowledge of general laws still very imperfect, but we constantly incur the risk of overlooking some of the laws which we do know. Hence the caution of experimental verification so constantly required.

As an example of one of these, take the science of naval architecture, which is a combination of deductions from mechanics, hydrostatics, pneumatics, and from the qualities of materials acting separately and in combination; and not only of deductions from these, but from some of the phenomena of animal and vegetable life. The fitness of the naval architect to perform the duties of his profession in perfection depends upon his familiarity with all these deductions,—a fitness developed in its highest form, if this familiarity be accompanied with the sagacity to discover deficiencies yet to be made good by further knowledge, and the errors in contrivance and adaptation by which the known deductions have not been fully availed of in practice.

Let us suppose a ship to be built in conformity with all the required deductive rules, with the exception of the rules deduced from the observed tendency to decay in timber under certain conditions. The consequence might be, as has more than once happened in our dockyards, that a specimen of naval architecture, magnificent in all other respects, is rendered totally useless for all intended purposes by dry-rot. Or, suppose that the laws of vegetable decomposition had been attended to, but that the laws of animal life had been unheeded. The lives of the crew and the property on board might be sacrificed to this omission—the ship's bottom becoming perforated by the worms, which are the denizens of the ocean. Or, again, let us suppose that the requisite deductions from all other sources had been complied with, but that certain other laws of vegetable and animal life had been overlooked. The ship's bottom is coppered to protect it from the worms, and the rapidity with which copper is decomposed by the action of the sea-water having been observed, the copper itself is protected by plates of iron. The ship sails on her voyage. She is long unheard of. The greatest anxiety prevails among the friends of those on board. At last, when given over by everybody, she does arrive, the crew and passengers having suffered most dreadfully from famine. The protracted voyage was occasioned by the sea-weed and barnacles which adhered to the ship's bottom, and thereby impeded her passage through the water. The slow, continuous decomposition of the copper is fatal to animal and vegetable life—it was stopped from want of attention to this important law.

The science of agriculture would afford equally appropriate illustrations of the caution and sagacity required in combining the deductions from the laws of mechanics, of chemistry, of hydrostatics, of pneumatics, of meteorology, of architecture, and of animal and vegetable life; a want of attention to any one of which may derange combinations in other respects perfect, and materially damage or even entirely destroy the expected results.

There is another class of sciences, those comprising the laws of social life, in which, although the deductions are obtained from a comparatively small number of elementary truths and inductions, the progress of mankind has perhaps been slower than in other departments of knowledge. Man has even been backward in admitting them among the sciences. This backwardness, originating as it did in error and ignorance, antecedent rather than opposed to experience, but strong by being entwined with prevailing associated trains of ideas, is fast disappearing from the world. As snow melts, and mists disperse before the rising sun, so does opinion not based upon experience, give way when brought into contact with that sounder opinion which is the result of cautiously conducted experiment and observation. It is now well understood that the construction of the social machine is as much the contrivance of a set of means adapted to an end, as the construction of a ship—the latter being the work of a scientific naval architect—the former that of the scientific moralist.

The scientific moralist obtains his deductions from the laws of human nature acting conjointly with certain laws of the physical world, particularly such of those laws as are connected with the production and preservation of a supply of the necessaries and comforts of life. Let us suppose him to have framed his institutions, and to have formed public opinion conformably with his deductions from those laws in all other respects, but to have neglected to provide for the secure enjoyment by each individual of the fruits of his own industry. This fatal omission would cause the country over which he rules to be the abode of an ill-fed, ill-clothed, and ill-housed population. Or, suppose that private property is acknowledged and protected, but that arrangements for the formation of a correct public opinion have been overlooked; in other words, that no provision has been made for a sound universal education. The country whose destiny he regulates, is occupied by a people quite unacquainted with the causes of high and low wages, of abundance and scarcity, and unconscious how much their happiness is dependent upon their own conduct and forethought, and who, in consequence, are perpetually exposed to famine, disease, and affliction. Or, again, such calamitous oversights as these being avoided, let us suppose that the administration and supervision of the laws and regulations which had been enacted, were entrusted either to a despot or to an irresponsible or semi-responsible body of legislators. Instead of good order, mutual confidence, and prosperity, he would see around him jarring, mistrust, and decay.

For the rules requisite to enable learners to make their own deductions with accuracy and readiness, reference must be made to works specially devoted to them.

PROBABILITY.

When man has exhausted all his resources in the way of observation and experiment,—has made himself acquainted, by means of a careful induction, with numerous general laws, and has deduced from these general laws, and from his knowledge of objects and their attributes, those subordinate laws which he habitually relies upon for his security and guidance, he still finds himself, on many occasions, left to guess, rather than to predict concerning the future; to calculate probabilities, rather than to anticipate certainties.

In considering what has been written under the head of Deduction, it will have readily suggested itself to the thoughtful reader, that two great causes are continually in operation to prevent the attainment of certainty in our anticipations. The first is ignorance, or not knowing and mis-knowing; and the second, is the difficulty of combining together the whole of a varied and large mass of deductions, the omission of any one of which is fatal to the correctness of our estimate of their combined effect.

Let the question which it is required to solve be the position of the moon, or of one of the planets on 1st day of January, ten years hence. The position required can be determined with accuracy, because it so happens that neither ignorance nor insuperable difficulty in the requisite combinations prevents the certainty of our anticipations.

But if the question to be solved be the character of the forthcoming harvest, ignorance and difficulty in tracing the effects of concurrent causes obstruct any certain solution. The laws of the weather are unknown; and the consequences upon vegetable life of particular states of heat, moisture, and electricity in the atmosphere, combined with the chemical and mechanical state of the soil, are difficult to trace, even when we know the effect of each separately. Or, if the question be, Will the ship *Trident* perform her voyage in safety from London to Calcutta? If all other circumstances could be ascertained, how could the inquirer be expected to learn that another ship, starting from a distant port, commanded by a drunken, reckless captain, would run into and sink her during the voyage? Or, if the question be, To what age will the new-born babe live?—or, What will be the disposition and attainments of the future man? The same difficulties here also prevent the attainment of certainty in our answers.

It would, however, but ill consort with the wants and wishes of mankind, to abandon the solution of these questions altogether in despair. Observation and experiment have satisfied us that, out of a hundred harvests, the number of good ones depends greatly upon the attention given to certain ascertained laws of agriculture; that out of one hundred ships proceeding from London to Calcutta, the number which will safely arrive depends greatly upon the attention paid to certain known laws of naval architecture, of navigation, and of human nature; that out of one hundred infants born, the number that will live to sixty years of age and upwards, depends greatly upon the attention paid to certain known laws of animal life and of social science; that out of one hundred children, the number who will grow up to be useful, intelligent, and happy men, depends greatly upon the skill with which our knowledge of the laws of human nature is turned to account in the grand business of education.

Enough has been said to show that if man have any regard for happiness, he must learn, where he cannot anticipate with certainty, to calculate probabilities. Where science cannot guide him to the certainty of attaining the gratification of his wishes, and the reward of his struggles, it can lead him, little by little, to a degree of probability almost equal to certainty. And when science has done its utmost, by direct means in the first instance, as in diminishing the uncertainty of the annual harvest, in diminishing the number of casualties at sea, in prolonging the duration of life, and in improving character and conduct; it again tenders its services, in a subsequent stage, to alleviate the suffering which the unremoved uncertainty might still occasion. Thus it has led mankind to provide against bad harvests, the recurrence of which they cannot prevent, by saving and by commercial intercourse; to guard against loss by sea and fire, by sea and fire insurance; and to alleviate the sufferings of those dependent upon them, by life insurance; and also to correct by subsequent reformatory discipline, the moral aberrations which educational skill could not succeed in preventing.

The historical records of knowledge show nothing more plainly than that the consequence to man of his progress, from age to age, has been his growing ability to anticipate with certainty that which had been formerly considered by him as reducible to no law, and to calculate the probabilities of that which he had been in the habit of leaving to vague surmise or blind fatalism.

As there are numerous occasions on which readiness and skill in calculating probabilities, and in contrasting certainty and probability, are indispensable requisites to enable man to form his judgment on matters, the due appreciation of which is of the utmost importance to his present repose and his projects for the future, a few instances, in illustration, may not be misplaced. They shall be given in succession; according as interest may be supposed to be felt:—1st, in events of the present time, but beyond the range of our own senses; 2nd, in events past; 3rd, in events to come.

As an instance of the first of these three classes of events, let us take the reported loss of a ship in the China seas, on her voyage from England. The event is corroborated by a mass of circumstantial evidence, making the loss appear quite certain to the reporters in China. But in England, while reading the accounts from China, we happen to know that the ship put into Brazil, on her outward voyage, with the loss of her masts, and that, owing to this detention, she could not possibly have been in the China seas at the time when the loss was reported to have occurred. In this case, the letters written by the captain himself, from Brazil, prevent our crediting the circumstantial narration of the loss in the China seas. An event, supported by great appearance of probability, is disproved incontestably by an opposing certainty. Had the accounts from Brazil never reached us, the circumstantial evidence of the loss might have made the same impression upon us as upon our friends in China.

As an instance of the second, let us take the defeat of the Roman consul, Claudius Pulcher, by Adherbal, the Carthaginian commander, in a naval engagement during the first Punic war, as related by Livy. There is no reason to suppose that this engagement did not take place; and the reported arrangements and tactics of the Carthaginian are sufficient to account for the Consul's defeat. But it also appears, according to the historian, that the Consul, before engaging, consulted the sacred chickens, who manifested their disapprobation of his intention by refusing their meat. The Consul, however, so far from attending to this admonition, flung contemptuously the cage and chickens into the sea, saying, "If they won't eat, let them drink," and lost the battle. Freed as we fortunately are from the superstitions of ancient Rome, we have no difficulty in separating this narrative into two parts: the battle and defeat, highly probable—the want of appetite in the sacred chickens, as the cause, or indicative of the defeat, palpably absurd.

In the first instance, the reported event was impossible, on account of its incompatibility with another known event. In this instance, the reported event is not impossible nor even improbable; but the reported cause of the event is quite irreconcilable with existing knowledge of cause and effect, forcing upon us the conviction that the historian's ignorance and credulity have led him to make one of those illusory statements so commonly indulged in by ill-informed people.

As an instance of the third, let us take the probable state of civilization and happiness in this country in the year 1900. Knowing, as we do, that industry to produce, knowledge to guide, and economy to preserve, are indispensable requisites for the possession of wealth, in the absence of which civilization cannot exist; and that the prevalence of feelings of brotherhood is the great source whence are to be expected such a distribution and employment of wealth as will most conduce to human progress, we must endeavour to satisfy ourselves as to the present state of public opinion in these respects, compared with what it was formerly, and what it is likely to be henceforward. The laws of social science, and the duties of social life, founded upon them, may, for all practical purposes, be said to be ascertained. What has been done,—what is being done,—what is likely to be done—towards diffusing a knowledge of these laws—towards inculcating the performance of these duties on the rising generation? All who think that the wealthy and intelligent have hitherto been, and still are, disgracefully negligent in the performance of the duties which their social advantages impose upon them, but that a spirit is beginning to manifest itself, indicative that measures will speedily be taken to wipe out this shameful blot, will prognosticate favourably of our state in the year 1900. But wars and convulsions may intervene to check the progress in the improvement of our habits, and in the diffusion of knowledge. On the other hand, the tide of improvement may already have set in so strong as to counteract the lurking influence of cupidity, rapacity, and destructiveness, still hanging in the rear of onward civilization. The effects of many laws, separately well known to us, acting in a state of combination, and of other laws, still only partially known or not known at all, must necessarily be difficult to compute. It would, therefore, be presumptuous to express ourselves with confidence concerning the state of civilization in the year 1900; although our knowledge may justify us in asserting that there are adequate grounds for thinking it probable that the state of our civilization in the year 1900 will be such that, compared with it, the state of the year 1800 will seem to be that of an age of barbarism.

As a very considerable portion of human affairs in the present state of knowledge, and perhaps of necessity for ever, must be conducted in conformity with the laws of probability, it is well to feel assured to what extent we may rely upon the deductions from such laws. A legitimate deduction must always have as much certainty as is contained in the law from which it is derived. Deductions from the law of gravitation, accordingly, have all the certainty which is contained in that law. But suppose the law from which we would wish to make deductions is "Man cannot safely be trusted with irresponsible power;" and that this law is found to fail once in a hundred thousand instances, then all deductions from such a law will be subject to the same degree of inaccuracy, and no more. The corrections required in our reasonings or deductions in the social sciences from the laws of human nature, are of this character, and may, therefore, for most purposes of practical utility, be dispensed with altogether.

It would clearly be a very insufficient reason for setting aside, or passing by, unheeded, the deductions from the laws of social life, that results predicable of society in general are not equally predicable of every individual in that society. If certain social arrangements demonstrably conduce to the creation of a good House of Commons, or a well-trained school, it would be madness to condemn such arrangements because under them was produced one bad member or one untractable scholar; although it would be the part of wisdom and virtue to strive to remove the cause of the evil, or to neutralize the effect, if the cause be irremoveable.

Classification.

The number, as well as the variety of the subjects which constitute knowledge, must in a very early period of man's history have forced upon him the conviction, that classification and arrangement were necessities of his understanding. Without these aids, the knowledge which he had succeeded in acquiring, would scarcely ever be available for use, or ready at hand for the daily purposes of life; nor would it be so suggestive to him as it is of deficiencies to be supplied, and of the extension to be expected, to which his future investigations may be most beneficially directed.

The survey of knowledge—of the subject matter of the understanding, so far made, leads us to consider, that as observation and experiment are what supply us with the materials for all subsequent operations, so the collecting, recording, and arranging of the subjects observed, may not improperly be selected as the basis of the first grand division in our classification. History, Geography, and Natural History, so far as they only describe and record facts and events, without pretending to interpret their causes, and Statistics are included in this division, for which no single general name would seem to have been appropriated.

This collection of facts is the warehouse, whence we draw the subjects of all our propositions concerning simple existence, which we are at once justified in predicating. The subsequent study and consideration of these subjects, enable us, as we have seen, to predicate, in addition, co-existence, sequence, causation, and resemblance. The development and subsequent predication of one or more of these is science, in the fullest acceptation of the term. This fivefold division is a comprehensive classification of all knowledge, of all things that can form the material of a proposition, of all questions that can be proposed, of all answers that can be returned to them.

Division and sub-division, and abstraction or separation, for the purposes of classification, may be adopted at will. Convenience and subservience to the development of further knowledge, need be the only considerations to limit and guide us in these operations.

Thus, for the purpose of minute inspection, we classify objects as mineral, vegetable, and animal, and each of these again is subdivided, and classified in one or more ways, as best suited to the particular purpose in hand.

Again, we separate or abstract the attributes of objects, and make them the subjects of separate examination. Thus, we contemplate at our pleasure, and quite undisturbed by any foreign interruption, number, form, weight, colour, motion, attraction, electricity, heat, elasticity, fluidity, and vitality; and the results of our contemplation are the sciences of mathematics, including arithmetic, geometry, and algebra, mechanics, hydrostatics, pneumatics, optics, acoustics, electricity, chemistry, animal and vegetable physiology, and social science.

Bringing together, again, in different combinations, the deductions from the various laws which constitute these sciences, we obtain another class of sciences of more mixed character, and more peculiarly adapted to furnish that guidance which is required by the arts and the daily business of life. Such are agriculture, astronomy, geography, navigation, architecture, engineering, hydraulics, anatomy, government, and education.

In conjunction with the more mixed sciences and their more minute subdivisions, we have the corresponding arts. Thus, in addition to the arts in immediate connexion with the above sciences, we have the arts of painting and sculpture, of surgery, of brewing and distilling, of cooking, of smelting, and so on; and, besides, the various industrial occupations to which the name of art is not applied.

It must be obvious that the only limit to our power of forming classes, is the capability of tracing differences upon which to form distinctions, and the only rule that need be observed, is to make the classification subservient to our convenience, whether for the purpose of recording or of examining. Not only are at-

√ tributes separated from the bodies of which they form a part, and divided into classes and sub-classes, but the presence or absence of an attribute may be made the ground of classification among the bodies themselves. Thus, men may be divided into civilized and uncivilized; European, Asiatic, African, or American; white, black, or copper-coloured; tall and short, ignorant and well-informed, industrious and lazy, thrifty and wasteful, sober and drunken, and so on. And out of these may be formed sub-classes, as European; industrious European; thrifty, industrious European; sober, thrifty, industrious European. In short, there may be as many classes as there can be general names, all of which necessarily connote attributes, and thus, constituting a class, are capable of subdivision.

JUDGMENT AND CONSISTENCY.

The man of judgment, as will readily be admitted by everybody who concurs in our previous exposition, is he whose memory, associations, and anticipations are all in harmony with the realities of the world, so far as known to his cotemporaries. If in knowledge he be behind the age in which he lives, in his judgment he will be also so far deficient; although deficiency of judgment is the epithet more commonly applied to the want of power and readiness in combining, concentrating, and acting upon such materials as are present to the understanding, than to the want of the materials themselves. To this latter want the epithet ignorance is generally applied.

As a consequence of the division of labour, which is as necessary for the extension of knowledge as for the production and accumulation of wealth, every individual, even the most gifted, must be comparatively uninformed on many subjects; and his judgment will be principally shown in the accuracy with which he calculates upon what is imparted to him as knowledge by those to whom he is compelled to resort. This accuracy of calculation, then, is the result of his knowledge of human nature — that portion of knowledge which, of course, no man of judgment can be without, whatever his acquirements may be in other respects, and which is only prominently noticed here as being more than anything else characteristic of the man of judgment.

But who is the consistent man? Is the man of judgment a consistent man? To answer

this question, we must ascertain what is
noted by this term " consistent." The
could hardly be applied to denote a man wh
variably perseveres in any expression of opi
or in any course of action, regardless e
of its truth or of its expediency. Such a
would deserve, and be more likely to
down upon himself, the appellation of perv
misguided, or unteachable. Pertinacit
error, then, is not consistency; and, c
quently, consistency cannot be understoo
connote mere pertinacity. Thus much fo
present. Let us now return to the ma
judgment.

Such a man, to whose lot it has not f
to relinquish many opinions, to correct
errors, to sever many associations of ideas
not yet been born. All history, overflo
as it is with evidences of the tardy but
gressive rectification of errors of opinio
conduct, assures us that no man of judg
has yet escaped from any educational e
lishment, whose character for judgmen
not of necessity been earned by casting
the delusions, and breaking through the t
mels, there imposed upon him.

It can be no very difficult matter for
imagine to ourselves a promising lad o

ast century, trained, as it was thought, successully under the benign influences of the best ontrived educational arrangements—skilled in the ready use of words in many languages; his memory practised and retentive, but principally loaded with hackneyed phrases, and with facts arranged in their chronological order; his anticipations for the future founded upon that ill-digested and superficial observation of antecedent and consequent, denominated "precedent," not upon that discriminating and comprehensive investigation which traces out "cause and effect;" stimulated to exertion, not by a thirst for knowledge and a love of mankind, but by a craving for distinction and attachment to a class; untouched, and therefore untaught, by those shining lights then burning in the world, but purposely shut out from his eyes; unmoved and unimproved by those bursts of devoted zeal and expansive benevolence then cheering all who were not, like him, surrounded by monastic walls. Forth he comes. The career of the statesman, the noblest for the truly gifted man, is open before him. He starts with but little of sterling knowledge to guide him, with many a base but dazzling counterfeit to mislead him. His case, however, is no longer quite hopeless: he is no longer confined within those dark cells. Truth, although late, may yet reach his ear and act upon his understanding. But, sad to say, he is subjected to another set of influences almost as malign, involved in the meshes of another set of arrangements almost as barbarous as those he had quitted. He continues enveloped in mystery and delusion. Born a century farther back, he would have been prepared to struggle for the maintenance of laws inflicting the penalty of death for heresy and witchcraft. As it is, institutions sanctioning, and laws adjudging, civil disabilities on account of mere differences of opinion, fines ruinous to the poor and nominal to the rich, bounties on pretence and insincerity, discouragements to scrupulous integrity, restrictions on industry, countenance to improvidence, the reckless destruction of life, the infliction of depraving punishments, the withholding of reformatory discipline, hinderances to freedom of discussion and communication, and to the diffusion of knowledge, with denial of mercy to ignorance, are all in their turn justified by him.

Let us, however, carry forward our imaginations—let us fancy ourselves able to trace this youth's progress from the inexperienced legislator to the statesman of maturer years. Despite the bewildering and contracting influences around him, he is not hermetically sealed up from truth within his college; the laws of cause and effect, as they really operate, the exposition of doctrines founded upon experience, and the exposure of errors, repeatedly knocking at the door of his understanding, at last force an entrance. Little by little, the mists of prejudice disperse, the college ligatures are burst, and the understanding, asserting its supremacy, does homage to truth, relinquishing illusions, correcting mistakes, and seeking progress. The glories of such a triumph must not be underrated. It must not be overlooked that our statesman is all this time surrounded by a vulgar herd, reared in the same trammels as himself, but without his force of character, who call themselves his friends. In acknowledging his errors, and avowing his new convictions, he must renounce their sympathy and good-will, and bear with their pitiful imprecations and bitter invectives.

It is undoubtedly true that we should not be justified in anticipating that a thousand youths so trained would among them develope one such man. An escape from intellectual bondage thus late in life is scarcely to be expected. But for this escape, however, our statesman could not certainly be called a man of judgment, nor, as we have already agreed, would he, without such an escape, have necessarily been a consistent man. So far as he has escaped, he is a man of judgment. Is he also to be deemed a consistent man?

We may now venture to proffer an answer to this question. As we are compelled to admit that a career of progress in knowledge unchequered by mistakes, from youth to manhood, never yet has been, perhaps never will be; and as pertinacity in error is not to be dignified with the appellation of consistency, it must be obvious that some other quality of the understanding must be looked out, to which this appellation can be fitly applied; and this quality can be no other than an ardent attachment to truth and progress, ever supporting under all mortifications, and propelling through all difficulties.

The consistent man, then, is not to be found, unless he be the man who cherishes the love, and practises the observance, of truth. Accordingly, whatever else the term "consistent" may connote, it must connote the "love and practice of truth," or be altogether discarded from the English language. Having it in use, and not wishing to part with it, let us conclude that he who is a man of judgment must also be a consistent man.

Pleasures and Pains.

The states of the understanding, which are termed pleasurable or painful, have already been more than once adverted to; but they are of sufficient importance to call for a separate examination. The first pleasures and pains of infancy are confined to sensations. To these are successively and rapidly added the pleasures and pains of memory, and the pleasures and pains of anticipation. The first pleasures and pains—those of sensation—may be supposed to be simple or unmixed; but when sensations begin gradually to have ideas associated with them, and particularly when ideas of cause and effect assume shape and consistency, pleasures and pains depart more and more from their simple or unmixed form, and, becoming compounded into an almost endless variety of combinations, they give rise to an equal variety of characteristics in the understanding.

One of the first consequences of memory and anticipation, is the association of present feelings of pleasure and pain with the past and the future. Joy and satisfaction, sorrow and regret, for example, are, in many instances, feelings of pleasure or pain, resulting from the memory of past pain no longer endured, or past pleasure no longer enjoyed. In like manner, hope and desire, fear and aversion are, in many instances, present pleasure or pain, resulting from the anticipation of future pleasures to be enjoyed, or future pains to be suffered; each term connoting the degree of intensity, as well as of probability, with which the future pleasure or pain is anticipated.

Among the more remarkable developments of the understanding, in its progressive formation, is the transference of the feelings of pleasure or pain from the immediate sensation to the cause of that sensation—from the sweet taste or smart blow to the person who administers it—from the effect to the cause. The affections of love and hatred are instances of feelings thus transferred, being generally fastened, not upon the pleasures and pains themselves, but upon the supposed causes of them. In elucidation of this process of transference, let us fix our attention, 1st, upon the pleasure of allaying the pains of hunger, thirst, and cold; 2nd, upon the labour of providing beforehand the means of enjoying this pleasure; and 3rd, upon the transference of the pleasure from the actual gratification to the labour itself of procuring the means of gratification. In numerous instances, the understanding becomes so habituated to dwell upon the labour with pleasure, that this pleasure continues long after the necessity of the labour, as a means for the attainment of the desired end, has ceased to exist.

Another class of pleasures and pains, also very complex, consists of such as are much interwoven with that tendency to imitation—that contagious disposition to do what others are doing—which assists so materially to maintain family, class, and national peculiarities. Every variety of dress, from the most irksome to the most convenient; every variety of amusement, from the most brutal to the most refining; every variety of occupation, from the most mischievous to the most useful; every variety of society and literature, from the most improving to the most depraving, may become pleasurable or painful, and greatly so, according to the habits prevailing in the part of the world, or in the station in society in which our lot may be cast; the morals, manners, and customs in which we seem to be led almost irresistibly to imitate.

In the combined influences of these different associations of ideas are to be traced our various sympathies and antipathies, named, as they are, according to the objects towards which they are directed: friendship and enmity towards individuals; kindness and unkindness towards children, our own species, or the animal creation in general; love of family, of party, of country, or of mankind—each of which, in its turn, may be absorbed in some master-association powerful enough for the purpose, whether that be the fear of death, or some more degrading and misleading impulse.

An enumeration, for the sake of contrast, of some of the prevailing pleasures among individuals and classes in different times and countries—which pleasures, it must never be forgotten, all take their origin in the associations of ideas forced upon us by surrounding circumstances—will give us a vivid picture of the varied and apparently contradictory ways in which man may seek to obtain pleasure and esteem, or, which is the same thing, to avert pain and disgrace.

To wear the scalp of a fellow-creature, to witness his excruciating agony under torture of one's own inflicting, to assassinate him, to spoil him, to kill him in a duel, to incarcerate him, to ruin him, to enslave him, to do violence to his conscience—to engage in prize-fighting, bull-baiting, cock-fighting, gambling, steeple-chasing, animal-torture and slaughter, and game-preserving—to be surrounded by pomp and display, to have at command wealth and power, as a means of exciting jealousy and envy, and of procuring the subserviency and flattery of the low, the unreflecting, and the uncultivated—to exercise intelligence, to acquire skill, to explore the hidden treasures of science, and practise the manipulations of art—to visit dungeons, the abodes of filth, misery and vice, hospitals and poor-houses, to work at the reformation of laws and institutions, to co-operate in the enlightening and elevating of public opinion, to establish and superintend schools, and to aid in so diffusing knowledge that its blessings may be extended to all.

What trains of ideas are suggested to the understanding by running the eye over such an enumeration! What encouragements to exertion, from the contemplation of the power at this moment wielded by the enlightened and the energetic, in training the rising generation to look for pleasure in those employments of their physical, intellectual, and moral faculties, which will at the same time promote the happiness of their fellow-creatures; and to look with loathing and disgust on the mere suggestion of extracting pleasure from what causes, in the remotest degree, the demoralization or misery of others!

EDUCATION.

There cannot, perhaps, be a more appropriate method of summing up, and at the same time of practically applying what has gone before, than to attempt it in connexion with a few remarks upon education. In doing this, we may be compelled to travel occasionally beyond the mere precincts of the understanding: the understanding being one only of the many subjects involved in the theory and practice, or science and art, of education. Another excuse for an occasional deviation of this kind will readily suggest itself to the thoughtful reader. However useful it may be for the purpose of undisturbed and accurate investigation, to make a separation and classification of man's faculties, the work of deducing rules for the formation of character and the control and direction of conduct, can only be accomplished by embracing in our thoughts all those faculties as one comprehensive whole. Hence, in treating of education in this place, it would be inexpedient, as well as difficult, to be strictly confined within the limits of what pertains to the understanding merely; and for transgressing these limits no apology need be offered.

The state of existence into which man is born is abundantly supplied with the means of enjoyment, it is also beset with various causes of suffering and misery. The object and aim in education should be so to conduct it that every man may have as large a provision as possible of the means of enjoyment, and be protected as much as possible against causes of misery. Throughout the entire course of education, in all its stages and details, the purpose for which it is designed and conducted should be carefully kept in view. It degenerates, otherwise, into a mere succession of unmeaning forms and unprofitable exercises, disheartening to the learner and unelevating to the teacher.

The first necessity of our existence, if it be wished to procure enjoyment and avert misery, is labour. Without labour this world would be a dreary wilderness, and man a miserable savage. The usefulness, the honourableness, the nobleness of labour, and, conversely, the disgrace and degradation of idleness should be sentiments interwoven with every thought and feeling of the human being. It need scarcely be added, that should the idea of labour, as a punishment, present itself to the understanding of the teacher, it ought only to present itself as among things to be discarded—to the understanding of the learner it need not present itself at all.

Next in importance to labour comes knowledge. To knowledge as a mere helpmate to labour, the same remarks are applicable. Knowledge, therefore, should never be presented to the learner under shapes and appearances which do not properly belong to it. Knowledge is attractive, fascinating, and stimulating to exertion and application. Its acquisition is a realized enjoyment, and an encouragement to further inquiry. True, its fair face and fascinating appearance may be deformed and rendered hideous by bungling ignorance, and an obstinate perseverance in ill-chosen courses, where better are known and have been pointed out. Who that has had any experience in the management of infancy and childhood, can be unacquainted with the restless curiosity of children to learn everything about the objects which surround them. When the trainers of infancy and childhood are themselves qualified to gratify this curiosity, and provided with the means, tears and annoyance will cease to be associated with the first attempts at learning. Our houses, our school-rooms, our gardens, our fields, with the animals which share them with us, supply lessons in abundance. The enjoyment of the varied pleasures of gratified curiosity, in common with numerous companions of their own age, and under the guidance of men of high attainments and benignant deportment, and devoted to their profession, will cause the expansion of the social feelings to keep pace with the development of the understanding, repressing or altogether preventing the growth of jealousy and envy.

Well selected exercises of the senses would seem to be peculiarly adapted to co-operate with these the first steps of learning. The well-informed and judicious trainer of youth, conscious how little man's inexperienced senses can do for him, compared with what these same senses can accomplish when aided by skilful guidance and exercise, will particularly devote himself to supply these aids. He will, by continual practice, lead his little troop to judge correctly of heights, lengths, breadths and depths, of shapes and sizes, of weights and measures, of colours, of lights and shades, of distances by the ear and the eye separately and in co-operation, of intervals of time, of areas, of changes of temperature, of conducting and non-conducting bodies, of the appearances of evaporation, condensation and solidification, and of differences and distinctions in general. These exercises of the senses may be usefully combined with manual and other muscular exertions, such as pulling, pushing, lifting, leaping, running, throwing, measuring—and all be cemented together by counting, describing, and recording. Can there be any doubt about the possibility of achieving all this without one single painful association? Or rather, would it not imply the grossest inaptitude and mismanagement, if the sensations in such exercises were not associated with trains of the most pleasurable, humanizing and elevating ideas and emotions?

The superstructure of language and elementary arithmetic, with the arts of reading, writing, cyphering, and drawing, will be reared without much difficulty on such a foundation.

Of course, it will be found that some children are more apt, and can learn more quickly, than others. But the listening to the bright and the forward, and the disposition to imitate, so observable in childhood, will help on the dull and the backward. The numerous class, involving as it does frequency of repetition, proffers valuable aid to the unretentive memory. Books, in the hands of a teacher who knows how to turn them to account, will appear what they really are, the delightful source of information not otherwise attainable. He will consult them, to extract from their pages narratives of past times and distant places, and descriptions of unapproachable objects; and these narratives read from time to time by him will entice his enchanted audience to redouble their efforts to acquire the power of reading also. His practised hand will guide them to make drawings of the objects which interest them. His voice will lead them so to modulate theirs, that words expressing improving thoughts, brotherly affection, ennobling sympathies, pathos, fun, and frolic, may be committed to memory, and repeated with the appropriate intonation and melody.

Then come geography and map-drawing,

combined with anecdotes and descriptions of the land of their birth and of foreign countries; geometry, with its attractive applications; elementary astronomy, and much more which judicious arrangement, and the steady extrusion of all worthless rubbish, will leave time and space for.

While all this useful and delightful instruction is going on, the model-man, the master-understanding, is continually in contact with the budding intelligence of his youthful scholars, who look up to him with affection and respect. Their memories become storehouses of facts, not of words. Their habits are those of cleanliness, application, order, and forbearance. Never having been goaded to learn what they could not eventually understand, the difficulties of acquiring knowledge, as they successively presented themselves, will always have been found to be worth the labour and application of overcoming.

Experience having confirmed them in the conviction of the advantages and pleasures of the habits and knowledge so far acquired, their anticipations will necessarily assume a form highly conducive to their subsequent good conduct when called upon to take an active part in the duties of life. The industry, and skill, and prudence which they will already have practised in the care of their persons and their clothes, and in the discharge of their school duties will have prepared them to acquit themselves with credit in the performance of their future social duties.

When industrial occupations can be blended with intellectual exercises and moral training, the advantages sure to result from such a combination should not be disregarded. Manual dexterity is no more to be acquired without the exercise of the muscles, than intellectual dexterity without the exercise of the understanding. To exercise the senses, the memory, and the affections, to train the will and the impulses to act, and the muscles to execute, in accordance with the understanding, not one or a few of these, exclusively of the others, but all of them together in one harmonious and comprehensive whole—that will be the effort and the aspiration of the really gifted teacher, of the perfect teacher, or of the teacher earnestly, though humbly, aiming at perfection.

A question of some moment suggests itself here. Even a hasty and imperfect survey of the field of knowledge and acquirement suffices to force upon us the conviction that everything cannot be taught to everybody;

and yet things comparatively insignificant must not be entirely neglected; their absence or departure from the world would be very inconvenient. What, then, is to be done? A selection must be made from among the numerous and varied subjects of knowledge. What must be taught to all? What is there that must not be omitted in any instance? What may be omitted with the greater number, provided a limited number apply themselves to secure to society the fruits of that knowledge which is thus unheeded by the mass?

Some of the boys in our schools may become farmers, some mechanics, some lawyers, some surgeons, some sailors, and so on; but all are to be men. Hence education would appear to divide itself into the general and the special —the general, in which all ought to share, and the special in which a few only need share. The latter will not be more particularly noticed here; our observations will now be directed to what is required to form the man, in whatever department of industry he may be destined subsequently to engage.

Let us suppose, then, that the plastic being thus far the object of our solicitude, whose character we have been striving to mould, has been trained to habits of industry, order, and economy, and that he has acquired skill, and knowledge, and the desire to increase and apply them. He is about to leave our schools and occupy one of the many openings which society presents to him. Whatever and wherever that opening may be, his comfort must greatly depend upon his acquaintance with the laws of society, and with the duties deducible from those laws. Those laws and duties he may by chance succeed in unravelling for himself; but, which is more probable, he may fail to do so, and be miserable in consequence. It is the duty of his teacher, therefore, to give him the necessary instruction and guidance beforehand.

A teacher who, having faithfully, zealously, and successfully executed his task thus far, should omit to perform this concluding duty, would be like the owner of a ship who, having with considerable pains and forethought fitted out his vessel, planned the voyage, hired the crew, and appointed the captain, should omit at the end to provide the captain with the requisite charts, or with such instructions as are indispensable for the success of the expedition.

With whatever other appliances the young man may be unprovided on leaving school, which is his port of departure, to enter upon the voyage of life, two things he must have, if procurable, unless most culpable negligence be chargeable somewhere—he must have a chart containing the laws of social life, and sailing instructions containing the duties deducible from those laws. These, combined with the subordinate knowledge and preparatory habits which have been sedulously implanted in him by those who knew the duties that he was destined to perform, purposely to qualify him for their performance, will cause him to start with reasonable prospects of a happy voyage — not, as has been but too often the consequence of our apathy and recklessness, with the almost certainty of early shipwreck.

The chart of social life is no mystery. The laws which it contains ought to be, and easily may be, registered in every understanding. Wealth, or the hoarded produce of previous labour, is essential to the existence of mankind in a state of happiness. Industry to produce, knowledge to guide, and economy to save, are the sources of wealth. Forethought and contrivance are the means by which this wealth may be made conducive to general happiness, particularly by which the numbers to be supported may be so proportioned to the wealth which is to support them, as that there may be enough for all to live as rational beings ought to live. Feelings of brotherhood in active operation, but controlled by judgment, are the means by which the mighty resources of knowledge, skill, and wealth, may be so directed as to correct and relieve those exceptional cases of misery, many of which may be consequences of ignorance and inertness, or of vicious propensities, which educational skill and attention have failed originally to prevent.

If these be fair samples of the laws contained in the chart of social life, the corresponding sailing instructions, the duties of social life, with which it behoves every man to comply, and the neglect of which will entail the probability, if not the certainty, of shipwreck and misery, must necessarily be:

1. To strive to the utmost to be self-supporting—not to be a burden upon any other man, or upon society.

2. To avoid making any engagements, explicit or implied, with persons now living or yet to be born, for the due performance of which there is no reasonable prospect.

3. To make such use of all superior advantages, whether of knowledge, skill, or wealth, as to promote on all occasions the general happiness of mankind.

The man who sets sail on the voyage of life with such a chart and such sailing instructions; having had his senses exercised, and consequently his ideas formed in unison with the realities of the world; his associations and memory harmoniously corresponding with the same; his anticipations reasonable; his exertions well directed, and efficiently applied to produce beneficial and prevent noxious effects, by resorting to appropriate causes; deducing from general laws founded upon the most rigid induction, and where certainty is not to be attained, calculating what is probable, and insuring, if possible, against the occurrence of the improbable; his judgment unclouded and unmystified, seeing everything in its true shape and size, and estimating it at its proportional value; sacrificing trifles to gain great ends, cheerfully enduring the minor though present suffering, where essential to provide against formidable, though remote evils, — that man may truly be called the grandest creation of art, the masterpiece of science, the glorious, the noble performance of that most useful combination of science and art—the true schoolmaster.

THE END.

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